DOCUMENT RESUME

ED 140 423	EA 009 579
TITLE	Emergency Educational Assistance Act, 1977. Hearings before the Subcommittee on Education, Arts and Humanities of the Committee on Human Resources. United States Senate. Ninety-Fifth Congress, First Session on S. 701. To Provide Federal Financial Assistance to Educational Institutions in Order to Assist Such Institutions to Meet the Emergency Caused by the High Costs of Fuel and Fuel Shortages and Harsh Weather Conditions, and for Other Purposes.
INSTITUTION	Congress of the U.S., Washington, D.C. Senate Committee on Human Resources.
PUB DATE	77
NOTE	311p.; For a related document, see EA 009 580; Not available in hard copy due to small type size of much of the document; Occasional pages may not be legible
EDRS PRICE	MF-$0.83 Plus Postage. HC Not Available from EDRS.
DESCRIPTORS	*Costs; *Educational Facilities; Educational Finance; Educational Legislation; Elementary Secondary Education; *Energy Conservation; *Federal Aid; Federal Government; *Federal Legislation; Fuel Consumption; *Heating; Post Secondary Education
IDENTIFIERS	*Emergency Educational Assistance Act

ABSTRACT

This publication is a comprehensive record of testimony and exhibits presented to a subcommittee of the Committee on Human Resources of the U.S. Senate during hearings on S. 701, the Emergency Educational Assistance Act of 1977. The main purpose of S. 701 is to provide educational institutions with federal assistance to help them offset the combined impact of high fuel costs, fuel shortages, and harsh weather during the winter of 1977. Separate hearings were conducted by the subcommittee on February 14, 1977 in Pawtucket, Rhode Island, and on March 11, 1977 in Washington, D.C. Testimony and exhibits are presented chronologically and indexed alphabetically by witnesses' names. (JG)

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EMERGENCY EDUCATIONAL ASSISTANCE ACT, 1977

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HEARINGS

BEFORE THE

SUBCOMMITTEE ON EDUCATION, ARTS AND HUMANITIES

OF THE

COMMITTEE ON HUMAN RESOURCES

UNITED STATES SENATE

NINETY-FIFTH CONGRESS

FIRST SESSION

ON

S. 701

TO PROVIDE FEDERAL FINANCIAL ASSISTANCE TO EDUCATIONAL INSTITUTIONS IN ORDER TO ASSIST SUCH INSTITUTIONS TO MEET THE EMERGENCY CAUSED BY THE HIGH COSTS OF FUEL AND FUEL SHORTAGES AND HARSH WEATHER CONDITIONS, AND FOR OTHER PURPOSES.

FEBRUARY 14, 1977
PAWTUCKET, R.I.

MARCH 11, 1977
WASHINGTON, D.C.

Printed for the use of the Committee on Human Resources

EA 009 579

U.S. GOVERNMENT PRINTING OFFICE
87-708 O WASHINGTON : 1977

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EMERGENCY EDUCATIONAL ASSISTANCE ACT, 1977

MONDAY, FEBRUARY 14, 1977

U.S. SENATE,
SUBCOMMITTEE ON EDUCATION, ARTS
AND HUMANITIES OF THE
COMMITTEE ON HUMAN RESOURCES,
Pawtucket, R.I.

The subcommittee met, pursuant to notice, at 9:45 a.m., in Goff Junior High School, Pawtucket, R.I., Senator Claiborne Pell (subcommittee chairman) presiding.

Present: Senator Pell.

Senator PELL. The Subcommittee on Education, Arts and Humanities of the Committee on Human Resources is glad to open the session of this hearing in Pawtucket. I thank very much the superintendent of schools for his opening statement. I have an opening statement of my own. I would defer to Mayor Lynch, though, who has many responsibilities today and must attend to them. So I ask if he would care to move ahead.

STATEMENT OF MAYOR LYNCH, MAYOR OF PAWTUCKET, PRESIDENT, BLACKSTONE VALLEY COUNCIL OF GOVERNMENTS AND PRESIDENT, RHODE ISLAND LEAGUE OF CITIES AND TOWNS, ACCOMPANIED BY EDWARD J. CREAMER, BUSINESS ADMINISTRATOR, PAWTUCKET SCHOOL DEPARTMENT

Mayor LYNCH. Thank you very much, Senator Pell. I have with me Mr. Edward Creamer who will also make a statement subsequent to mine. I am very happy that the students are here this morning to participate in this democratic process to give them a better idea of what goes on throughout this land and the chance that we as citizens have to afford ourselves the opportunity to appear before Congress at committees and have a direct say in things that vitally affect our lives. So, on behalf of the city of Pawtucket, I'd like to welcome you, Senator Pell, and the staff of the Education, Arts, and Humanities Subcommittee to our city. I appreciate the opportunity to appear here today in a multifaceted role as mayor of Pawtucket, president of the Blackstone Valley Council of Governments, and president of the Rhode Island League of Cities and Towns. As a mayor, I have had the occasion to work with many groups affiliated with education in Rhode Island. In my opinion we should all commend the local taxpayers' efforts to support good public education through their school committees and administrators. Here in Pawtucket, for example, excellent cooperation and a tight rein have resulted in quality education, good fiscal management, and our buildings program's completion. However, despite this and similar efforts around the State, tremendous problems—including the high cost of energy—are damaging our ability to bear the costs of public education in Rhode Island. Personally, I take a great deal of pride in the Pawtucket school system. As I stated earlier, our building program is virtually complete. In the past 20 years, Pawtucket has erected eight new school buildings and has also spent some $10 million on necessary renovations to rehabilitate older buildings.

Even so, we face problems both in the short run and long range. The short run problem appears greater. As mayor, I submit the school budget as part of the overall city budget and can personally attest to the increasing cost of energy, particularly in the past few years. Mr. Creamer, the business administrator of the Pawtucket School Department, will be able to give you more specifics in that area, but I would like to draw your attention to a long-range problem that we in Pawtucket share with other cities—that of buildings in good condition operating with outdated heating plants. This very school in which we sit is an example. Goff Junior High School is over 50 years old. Throughout the years the school department has maintained this facility admirably. However, the original heating plant is still in service. It is more expensive and less efficient than modern heating plants. Several other buildings in Pawtucket suffer the same condition and this situation exists in many other schools as well. The school administration recognized this problem and brought it to my attention 1 year ago. At that time, I assigned a high priority to the school department for title X public works money and a $40,000 heating renovation project was completed in another building. To continue such an effort, Pawtucket and other local communities will need help from the Federal Government.

Mr. Chairman, your proposal for matching funds for capital improvement for buildings would result in better energy efficiency, as well as public savings, with the added bonus of putting some of our people to work. Once again, gentlemen, I thank you for this opportunity and would be happy to answer any questions you might have.

Senator PELL. Thank you very much. Mr. Creamer.

Mr. CREAMER. Thank you, Senator and Mayor Lynch. I think everything that the mayor has said reflects the thinking of the Pawtucket School Department. I think the city of Pawtucket is symbolic of the problems that all school districts face in the State, indeed, the Nation, that we have our problems. As the mayor has indicated, over the last 20 years this community has made tremendous strides in improving its school plant. We have put up, as the mayor has said, eight new buildings for new school additions. We have spent some $5 million rehabilitating the six remaining so-called older schools. We have put in new lighting, new floors, new ceilings, new libraries, new laboratories, and in five of those six schools we've put in new windows, and the sixth school was scheduled to have new windows next year.

This community, since 1954, has supported 32 straight bond issues for the renovations of schools or for new school construction. Unfortunately, last November we suffered the first defeat we've ever had, at least in recent memory in a reconstruction bond issue. We'd like to think there were extenuating circumstances, and hopefully the parents and people of this community will support us in another year. However, we have made great strides in the rehabilitation of these older buildings, all of which, as the mayor has pointed out, are over 50 years old, that is, the remaining six. The important factor to us at this point is that all six of these schools have outdated heating systems that are in excess of 50 years old. As a result, you can notice in certain schools the windows are open and they would have to be open in order that the children get some fresh air. I think at this point, though, that we have reached a crisis situation. We do not have any further bond issue to repair our buildings. The mayor, in this current year, has cut our budget $800,000, as indeed he had to. There was just a certain amount of money that the people of Pawtucket were willing to raise for education. He is astute and well aware of the limit that the people of Pawtucket are willing to pay for education. So that I do think we do have problems. We are caught in inflationary cycles as all of the other school districts are. Fuel bills and energy bills have tripled in the last 4 years. As a result, the educational program has had to take a serious cut. Your bill we think, Senator, would go a long way to improving the educational program in Pawtucket. Thank you.

Senator Pell. Thank you very much, indeed. I believe that the city of Providence reported an estimated $380,000 deficit in the heating account of the school department. I'm wondering what the deficits would be here in Pawtucket and if there is a similar problem here.

Mr. Creamer. Yes, there is. As of a month or two ago, the superintendent of schools issued orders that there be no further expenditures within this department, and even freezing all of our expenditures for the remainder of the school year. We expect a substantial deficit in fuel alone. It will be at least $100,000. I would expect we'll probably end the year short by $200,000 to $300,000. However, we're doing everything we can to possibly economize. The important point is Pawtucket has really striven to improve its heating plants or improving the heating systems by putting in new windows and everything it possibly could, but we've never had the funds to rehabilitate the older heating systems. I think that if we had the funds, as your bill apparently would allow us to do on a matching basis, I think we could go a long way toward reducing our expenditures in the future.

Senator Pell. In other words, this cold winter has produced an extra $100,000 expense above the ordinary for the expenditure of your city.

Mr. Creamer. Yes.

Senator Pell. What would be the normal expenses for the heating of the schools in Pawtucket if there had not been this cold winter? What were they last year?

Mr. Creamer. The heating and electricity were combined together. We do have electrical schools which will probably run somewhere between $500,000 and $600,000. So that this year it would probably approach $700,000.

Senator Pell. Have you received any help from the Federal Government to date in coping with the problems caused by the energy crisis?

Mr. Creamer. No, we have not except for a minor title X project of $40,000 Mayor Lynch alluded to in which we did do some minor heating repairs last summer on a matching basis.

Senator Pell. What kind of assistance would you find most valuable, would you find assistance as set forth in my bill with these matching funds or would you want a direct grant? Do you have any thoughts as to the ideal way the Federal Government could be of help if legislation is achieved?

Mr. Creamer. I personally would prefer a direct grant that would be directed categorically toward solving heating problems. In the matching funds, of course, there is always the certain percentage that go into administrative costs. Personally, I would like to see funds directed in the manner that Federal revenue sharing is directed where it goes directly from the Federal Government to the community for a specific purpose, in this case, to improve the heating problems and thereby conserve fuel and conserve energy.

Senator Pell. I thank you very much, indeed. I thank Mr. Creamer and particularly Mayor Lynch for giving up his time, and I wish him well, and thank you very much.

Mayor Lynch. Thank you, Senator.

Mr. Creamer. Thank you.

Opening Statement of Senator Pell

Senator Pell. I'll now read into the record my opening statement concerning the current energy crisis and the effect it is having on our Nation's educational system.

Three years ago, on January 7, 1974, I convened hearings in Washington concerning that same subject. At that time, the Senate Subcommittee on Education urged the national administration to develop a sound and comprehensive energy-use program, one that would not treat the energy crisis as just a temporary occurrence, but one that would recognize the full magnitude and extent of the problem. Since those hearings in 1974, very little has been done. Most of the recommendations of those hearings have gone unheeded.

Three years ago I said that the energy crisis was not a short-term problem, but one that would be with us for years to come. Today, it is still with us, but this time its danger is more apparent and its permanence more understood. We are all aware of the horrifying accounts of the damage caused by this winter. Record low temperatures have been set in the North and East, and the ill effects have been felt in the Southern States as well. The damage done by this harsh winter will cost us millions to repair. Everywhere we look, the picture is grim. The cost of energy has spiraled, the need for energy has doubled and redoubled. Yet, all of this was foreseen.

In 1974, the reality of the energy crisis was pointed out to the national administration. A challenge was presented to it—a challenge to confront the energy crisis head-on and find ways to control and conquer it. The national administration did not meet that challenge.

Today, we are once again holding hearings. But, today we are no longer willing to wait for someone else to act; today we are prepared to seize the initiative ourselves.

Last week I introduced a piece of legislation which will offer our educational community some relief from the effects of the energy crisis. That relief is sorely needed and long overdue.

During these past few weeks, we have been deluged with news reports about the damage to our educational process caused by the energy crisis. Here in Rhode Island, those news reports have been as grim as the reports from other areas of the Nation. The *Providence Journal* on January 24th of this year reported that "unexpectedly severe weather and lack of energy conservation by numerous customers are draining the University of Rhode Island's $2.5 million energy budget for the 1976–77 year." The *Westerly Sun* reported on January 28, 1977, that "providing warm classrooms for school children in Charlestown, Richmond, Hopkinton and Westerly cost each school district up to 41 percent more money and up to 50 percent more in fuel consumption than last year." The *Brown Daily Herald* of January 21, 1977, reported that "Brown's energy costs are running $100,000 over projection because of increased heating use during what is turning out to be Providence's coldest winter in years." In Providence, the February 4, 1977 *Providence Evening Bulletin* reported that "the city school department is projecting a $308,000 deficit in its heating account this school year because of the unusually cold temperatures that have gripped this State in the last 2 months," and the *Woonsocket Call* of January 31, noted that "the school heating bills for the schools in the Greater Woonsocket area have soared." I could go on with similar reports from all of Rhode Island's cities and towns, as well as similar reports from most areas around this Nation. The underlying point of all these reports is clear—the weather has hit our schools especially hard, and they need assistance.

While the national administration has been slow in attacking the energy crisis, I want to commend the Rhode Island educational community for the initiative it has taken on its own. In 1973, the commissioner's energy task force was established to develop long-range plans to enable Rhode Island's schools to cope with the energy crisis. The work of this Commission has been very successful. At the University of Rhode Island, an energy conservation effort has resulted in significant decreases in energy consumption. In fact, energy consumption at the university has decreased 25 percent over the past 5 years.

Yet, although State and local educational communities have acted, they do not have the financial resources to fight the battle alone. And, they should not have to, for the crisis is of national scope, and the Federal Government has a legitimate role to play in attacking that crisis. Furthermore, it represents good common sense for the Federal Government to become financially involved with respect to schools and the energy crisis. Education consumes 11 percent of all energy generated in the United States. So, when we address the problem of education and the energy crisis, we are not talking about minimal savings. If we conserve energy in the area of education, the entire Nation will benefit. By acting in the educational area, we will be taking a large step toward resolving the energy crisis on a national level.

It is my hope that S. 701 will represent the essential first step. S. 701 will directly involve the Federal Government in providing financial assistance to the educational community in its efforts to cope with the energy crisis. It will emphasize conservation measures, for we must realize that our energy supply is not unlimited and more efficient uses of that supply must be undertaken.

[The text of S. 701 follows:]

95TH CONGRESS
1ST SESSION

S. 701

IN THE SENATE OF THE UNITED STATES

FEBRUARY 10 (legislative day, FEBRUARY 1), 1977

Mr. PELL introduced the following bill; which was read twice and referred to the Committee on Human Resources

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A BILL

To provide Federal financial assistance to educational institutions in order to assist such institutions to meet the emergency caused by the high costs of fuel and fuel shortages and harsh weather conditions, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That this Act may be cited as the "Emergency Educational Assistance Act".

STATEMENT OF FINDINGS

SEC. 2. (a) The Congress finds that—

(1) educational institutions throughout the Nation need emergency assistance to continue delivering educational services to students in the face of the increased costs of operating school facilities;

II

(2) the maintenance and operation of elementary, secondary, and postsecondary school facilities is extraordinarily costly and the proportion of expenditures used for physical plant has increased faster than that of any other educational expenditure;

(3) many older school facilities can be remodeled or renovated so that the cost of their operation can be reduced;

(4) school and university administrators can be helped through technical assistance to reduce the operating costs of school facilities;

(5) educational personnel throughout the Nation can benefit from a demonstration program which shows how specific remodeling, renovation, and management projects can produce savings; and

(6) the emergency now facing many States, localities, and educational institutions, due to the continuing rise in fixed expenses, threatens the quality of education throughout the Nation.

(b) It is the purpose of this Act (1) to make basic grants to educational institutions to enable them to undertake measures to make school facilities more efficient to operate, (2) to make demonstration grants to State agencies and educational institutions for projects which show great promise of meeting the needs described in subsection (a) of this section and (3) to provide technical assistance to such agencies and institutions.

BASIC GRANTS AUTHORIZED

SEC. 3. (a) The Commissioner shall, in accordance with the provisions of this Act, make basic grants to educational institutions to pay the Federal share of the costs related to energy conservation measures undertaken by any such institution, including the cost of insulation, remodeling, and renovation of school facilities.

(b) For the purpose of making such grants, there is authorized to be appropriated $300,000,000 for the fiscal year 1978 and for each of the succeeding fiscal years ending prior to October 1, 1981.

ALLOTMENTS FOR BASIC GRANTS

SEC. 4. (a) (1) From the sums appropriated pursuant to section 3 (b), the Commissioner shall allot not more than 1 per centum among Guam, American Samoa, the Virgin Islands and the Trust Territory of the Pacific Islands according to their respective needs.

(2) From 80 per centum of the remainder of such sums the Commissioner shall allot to each State an amount which bears the same ratio to such 80 per centum as the population of the State bears to the population of all States.

(3) The remainder of the sums appropriated under section 3 (b) shall be available to the Commissioner for making basic grants under this Act.

(b) (1) The amount by which any allotment to a State for a fiscal year under subsection (a) exceeds the amount which the Commissioner determines will be required for such fiscal year for applications approved under section 6 within such State shall be available for reallotment to other States in proportion to the original allotments to such States under subsection (a) for that year, but with such proportionate amount for any such State being reduced to the extent it exceeds the sum the Commissioner estimates such State needs and will be able to use for such year; and the total of such reductions shall be similarly reallotted among the States whose proportionate amounts were not so reduced. Any amounts reallotted to a State under this subsection during a fiscal year shall be deemed part of its allotment under subsection (a) for such year.

(2) In order to afford ample opportunity for all educational institutions in a State to submit applications for assistance under this title, the Commissioner shall not fix a date for reallotment, pursuant to this subsection, of any portion of any allotment to a State for a fiscal year which date is earlier than ninety days prior to the end of such fiscal year.

(3) Notwithstanding the provisions of paragraph (1)

of this subsection, no portion of any allotment to a State for a fiscal year shall be available for reallotment pursuant to this subsection unless the Commissioner determines that the applications for assistance under this Act for basic grants which have been filed by educational institutions in that State for which a portion of such allotment has not been reserved (but which would necessitate use of that portion) are applications which do not meet the requirements of this Act or which set forth programs or projects of such insufficient promise for achieving the objective of this Act that their approval is not warranted.

(c) The population of a State and of all States shall be determined by the Commissioner on the basis of the most recent satisfactory data available to him from the Department of Commerce.

USES OF BASIC GRANTS

SEC. 5. Payments made for basic grants under this Act to any educational institution may be used in accordance with applications approved under section 6(b) by that institution for the Federal share of the cost related to energy conservation measures undertaken by that institution including the costs of insulation, remodeling, and renovation of school facilities of that institution.

APPLICATIONS

SEC. 6. (a) Payments may be made for basic grants under this Act only upon application to the Commissioner at such time, in such manner, and containing or accompanied by such information as the Commissioner may reasonably require. Each such application shall—

(1) provide assurances that because of—

(A) the high cost of energy,

(B) energy shortage, or

(C) unusually harsh and persistent adverse weather conditions,

the applicant is in need of assistance;

(2) provide a full description of the energy conservation measures to be taken by that institution, and assurances that payments made under this Act for basic grants will be used for the purposes set forth in section 5;

(3) set forth policies and procedures to assure the Federal funds made available for basic grants under this Act for any fiscal year will be used so as not to supplant the level of State and local funds that would otherwise be available for the purposes described in section 5;

(4) provide that effective procedures will be adopted for evaluating the effectiveness of the assistance given for basic grants under this Act;

(5) provide that fiscal control and fund accounting procedures will be established as may be necessary to

insure the proper disposal of, and accounting for Federal funds paid to the educational institution under this Act; and

(6) provide that reasonable reports will be furnished in such form and containing such information as the Commissioner may reasonably require and such records will be kept and access furnished thereto as the Commissioner may find necessary to assure the correctness and verification of such reports.

(b) Applications for financial assistance for basic grants under this Act may be approved by the Commissioner only if—

(1) the application meets the requirements set forth in subsection (a); and

(2) the application has been submitted to the appropriate State agency for comment before being submitted to the Commissioner.

(c) Amendments of an application shall, except as the Commissioner may otherwise provide, be subject to approval in the same manner as the original application.

DEMONSTRATION PROJECTS

SEC. 7. (a) The Commissioner is authorized to make grants to State educational agencies, State energy offices, other appropriate State agencies, local educational agencies, and institutions of higher education for demonstration projects which involve the development and use of energy conservation measures which show unusual promise of promoting the objectives of this Act.

(b) To the extent practicable the Commissioner shall approve applications for payments under this section in such manner as will most nearly provide an equitable distribution of financial assistance among the States.

(c) No payment may be made under this section unless the Commissioner determines that the payment is to be used for a project for which assistance is necessary because of the high cost of energy, the shortage of energy, or unusually harsh and persistent adverse weather conditions.

(d) No payment may be made under this section unless an application is submitted to the Commissioner at such time, in such manner, and containing or accompanied by such information as the Commissioner may reasonably require. Each such application shall include provisions that—

(1) assure that the project will be economically feasible;

(2) set forth the rate of return based upon the energy management component of the project compared with the rate of return based upon the remodeling or renovation component of the project; and

(3) describe whether it is feasible to use the results of the project in other communities.

(e) There are authorized to be appropriated to carry out the provisions of this section $50,000,000 for the fiscal year 1978 and for each of the succeeding fiscal years ending prior to October 1, 1981.

TECHNICAL ASSISTANCE

SEC. 8. (a) The Commissioner is authorized to make grants to State educational agencies, State energy offices, other appropriate State agencies, local educational agencies, and institutions of higher education to pay the Federal share of the cost of providing technical assistance for energy conservation measures.

(b) Such technical assistance may include—

(1) the temporary employment of specially qualified personnel necessary for—

(A) the planning and implementation of energy conservation or energy management projects including energy use evaluations, and

(B) the planning and development of remodeling, renovation, repair, replacement, or insulation projects;

(2) the conduct of specialized studies on the implementation of building management or maintenance projects;

(3) the conduct of feasibility studies on energy

management and energy remodeling or renovation projects; and

(4) the conduct of energy use evaluations.

(c) No payment may be made under this section unless the Commissioner determines that the payment is to be used for technical assistance which is necessary because of the high cost of energy, the shortage of energy, or unusually harsh and persistent adverse weather conditions.

(d) No payment may be made under this section unless an application is submitted to the Commissioner at such time, in such manner, and containing or accompanied by such information as the Commissioner may reasonably require. Each such application, in the case of a local educational agency, shall contain provisions designed to assure that the technical assistance for which assistance is sought will, to the greatest extent practicable, be shared with private elementary and secondary schools in the school district of such agency.

(e) There are authorized to be appropriated to carry out the provisions of this section $150,000,000 for the fiscal year 1978 and for each of the succeeding fiscal years ending prior to October 1, 1981.

PAYMENTS

Sec. 9. (a) (1) From the amount allotted to each State under section 4 (a) the Commissioner shall pay to each educational institution within such State having an application approved under section 6(b), an amount equal to the Federal share of the cost of carrying out the application of such institution.

(2) The Federal share of the cost of carrying out the application of an educational institution for basic grants under section 6 shall be 50 per centum for any fiscal year.

(b) (1) From the amounts appropriated pursuant to section 7(e) the Commissioner shall pay to the agency, office, or institution having an application approved under section 7(d) the Federal share of the cost of carrying out its application.

(2) The Federal share of the cost of carrying out the application of an agency, office, or institution for demonstration grants under section 7 shall be 66⅔ per centum in any fiscal year.

(c) (1) From the amount appropriated pursuant to section 8(e) the Commissioner shall pay to any agency, office, or institution having an application approved under section 8(d) an amount equal to the Federal share of the cost of carrying out its application.

(2) The Federal share of the cost of carrying out the application of an agency, office, or institution for technical assistance under section 8 shall be 50 per centum for any fiscal year.

(d) Whenever the Commissioner determines that an educational institution with an approved application for a basic grant under section 6(b) or an educational institution with an approved application for technical assistance under section 8 is suffering from extreme financial need and cannot, because of the limitation of Federal financial assistance to 50 per centum of the cost of the approved application, carry out the project described in that application the Commissioner may waive such limitation and may pay the full cost of carrying out the approved application.

WITHHOLDING

Sec. 10. Whenever the Commissioner, after reasonable notice and opportunity for hearing to any agency, office, or institution receiving assistance under this Act, finds that there has been a failure to comply substantially with the provisions set forth in the application approved under section 6(b) or section 7(d) or section 8(d), the Commissioner shall notify the agency, office, or institution that further payments will not be made to the agency, office, or institution under this Act until he is satisfied that there is no longer any such failure to comply. Until he is so satisfied no further payments shall be made to the agency, office, or institution under this Act.

ADMINISTRATION

SEC. 11. (a) Nothing contained in this Act shall be construed to authorize the making of any payment under this Act for religious worship or instruction.

(b) Prior to the promulgation of any regulations under this Act for the submission and approval of applications, the Commissioner shall consult with mechanical contractors, professional engineers, business officials of elementary and secondary schools and institutions of higher education, officials having responsibility for energy conservation and energy use in such schools and institutions, and officials of the Federal Energy Administration and the Energy Research and Development Administration.

(c) In administering the provisions of this Act the Commissioner is authorized to use the services and facilities of any agency of the Federal Government and any other public or nonprofit agency or institution in accordance with appropriate agreements and to pay for such services either in advance or by way of reimbursement as agreed upon.

DEFINITIONS

SEC. 12. As used in this Act:

(1) The term "Commissioner" means the Commissioner of Education.

(2) The term "educational institution" means any local educational agency and any institution of higher education.

(3) The term "elementary school" means a day or residential school which provides elementary education, as determined under State law.

(4) The term "institution of higher education" means an educational institution in any State which (A) admits as regular students only persons having a certificate of graduation from a school providing secondary education, or the recognized equivalent of such a certificate, (B) is legally authorized within such State to provide a program of education beyond secondary education, (C) provides an educational program for which it awards a bachelor's degree or provides not less than a two-year program which is acceptable for full credit toward such a degree, (D) is a public or other nonprofit institution, and (E) is accredited by a nationally recognized accrediting agency or association or, if not so accredited, (i) is an institution with respect to which the Commissioner has determined that there is satisfactory assurance, considering the resources available to the institution, the period of time, if any, during which it has operated, the effort it is making to meet accreditation standards, and the purpose for which this determination is being made, that the institution will meet the accreditation stand-

ards of such an agency or association within a reasonable time, or (ii) is an institution whose credits are accepted, on transfer, by not less than three institutions which are so accredited, for credit on the same basis as if transferred from an institution so accredited. Such term also includes any school which provides not less than a one-year program of training to prepare students for gainful employment in a recognized occupation and which meets the provision of clauses (A), (B), (D), and (E). For purposes of this subsection, the Commissioner shall publish a list of nationally recognized accrediting agencies or associations which he determines to be reliable authority as to the quality of training offered.

(5) The term "local educational agency" means a public board of education or other public authority legally constituted within a State for either administrative control or direction of, or to perform a service function for, public elementary or secondary schools of a city, county, township, school district, or other political subdivision of a State, or such combination of school districts or counties as recognized in a State as an administrative agency for its public elementary or secondary schools. Such term also includes any other public institution or agency having administrative control and direction of a public elementary or secondary school.

(6) The term "secondary school" means a day or residential school which provides secondary education, as determined under State law.

(7) The term "school facilities" includes classrooms and related facilities of an elementary school, secondary school, or an institution of higher education, and initial equipment, machinery, and utilities necessary or appropriate for educational purposes; but does not include athletic stadiums, or structures or facilities intended primarily for athletic exhibitions, contests, or games or other events for which admission is to be charged to the general public.

(8) The term "State" includes in addition to the several States of the Union, the Commonwealth of Puerto Rico, the District of Columbia, Guam, American Samoa, the Virgin Islands, and the Trust Territory of the Pacific Islands.

(9) The term "State educational agency" means the State board of education or other agency or officer primarily responsible for the State supervision of public elementary or secondary schools, or if there is no such officer or agency, an officer or agency designated by the Governor or by State law.

Senator PELL. I am hopeful that today's hearing will begin an essential dialogue, one that will focus attention not only on the problems the energy crisis is bringing to education, but one that will also bring about the beginning of a real commitment to conservation and a sound and efficient national energy-use policy.

I am grateful for the fact that Mayor Lynch, who is the president of the Rhode Island League of Cities and Towns as well as being Mayor of this city, has been able to be with us and testify.

Now we'll move on to the next panel which is the panel representing the teachers. Here we have Mr. Edward McElroy, president of the Rhode Island Federation of Teachers, and Mr. Ronald DiOrio, president of the Rhode Island Education Association. If they are here, would they come forward. Is anybody here from the NEA?

Mr. MCELROY. I have to take care of one organization, that's enough. If you'd prefer, I'd be willing to wait a while.

Senator PELL. As a matter of courtesy, maybe we could just wait about 15 minutes and see if he is coming. We'll move on to our next panel which represents school boards and administrators, Mary Cole, executive director, Rhode Island Association of School Committees and Mr. Joseph Gaudet, executive director, Rhode Island Association of School Superintendents.

Also, I must thank the students of Goff Junior High School for giving us a sense of real community interest and participation. Thank you very much for being here.

STATEMENT OF MARY COLE, EXECUTIVE DIRECTOR, RHODE ISLAND ASSOCIATION OF SCHOOL COMMITTEES AND JOSEPH GAUDET, EXECUTIVE DIRECTOR, RHODE ISLAND ASSOCIATION OF SCHOOL SUPERINTENDENTS, A PANEL REPRESENTING SCHOOL BOARDS AND ADMINISTRATORS

Ms. COLE. Senator Pell and members of the Senate Subcommittee on Education, I also would like to greet the students. It's really delightful to see you here with us this morning. On behalf of the school board members throughout Rhode Island I thank you for the opportunity to express some of their thoughts regarding continuing efforts in the preservation of energy. I am certain Mr. Joseph Gaudet, executive director of the superintendents' association will be telling you of the efforts of each school district and the conservation of energy in our schools.

In my work as executive director of the Rhode Island Association of School Committees, I would like to call your attention to the most difficult problem of a school committee, that of having a school budget approved by those who have the authority to do so. Approximately 90 percent of the school budgets consist of fixed charges such as salaries, heat, lights, electricity, insurance, and so forth. This means that if a budget is approved as presented, and we all know that school boards are having to live with drastically cut budgets these days, there remain only 10 percent to provide items such as textbooks and materials that give our children a quality education. Maintenance, the key to energy saving, a soaring cost, becomes a part of this 10 percent. In order not to hurt our children, the maintenance budget becomes the first to be attacked. I would ask those who might tell me, of the 400 schools how many need window replacement perhaps on long-range plans, and boilers, are they being patched or replaced with board members praying they will hold out for just one more season.

Our State fire code has been costly but has taken us a long way in the preservation of energy. Do we need an energy code which will mean the tradition of maintenance costs will become a thing of the past? I fully realize such a suggestion can only mean additional moneys for the items which I mentioned. I would hope therefore that from this important gathering I would leave one thought: An energy code for schools with funding to be provided through legislation to carry such a code out. Piecemeal maintenance is just not enough. The day of approval of bond issues for new construction seems to be at a standstill. The buildings that our children will continue to be educated in must be preserved through the efforts of all concerned. School board members need this assistance, and with your help perhaps they will have it.

May I thank you, Senator Pell and members of your subcommittee for allowing me to present this opinion for your consideration.

Senator PELL. Dr. Gaudet, you are welcome here.

Dr. GAUDET. Senator Pell and members of the committee: first of all, may I say I represent the superintendents of schools of this State, and on their behalf I would like to extend to you our appreciation for bringing this hearing from Washington to Rhode Island, specifically in Pawtucket to give us all a more real chance to talk to you and the members of your committee concerning this very real crisis. We thank you very much for taking the trouble to have a hearing in Rhode Island.

Senator PELL. I would interrupt you to say thank you for those words and also that I invited, although they couldn't be with me today, the members of the Rhode Island delegation. These hearings will be available to all of us. Again, I'm very glad you came.

Dr. GAUDET. In your letter inviting us to testify before your committee, Senator, you indicated your concern primarily in the immediate effect on education of the energy crisis. The immediate effect on education is the shortening of school budgets because the energy costs are taking so much out of the school budgets currently in Rhode Island and in various school districts that some school committees and towns are having a real difficulty in paying their bills this year and continuing the school in operation for 180 days. A lot of school budgets are in difficulty, and that is primarily due to the great costs of energy which they have to pay, the bills they have to pay from the line items of their budgets.

I should like now to read a few things on this testimony concerning this whole issue. For the past 4 years, we have exercised fuel conservation in our schools by lowering thermostatic settings in school buildings below 70 degrees when schools are in session and below 60 degrees when schools are not in session. Zone controls where possible have been installed and efficiency of mechanical systems have been checked. Windows and fenestration in general have been kept in good repair and tightened where possible. All lighting and illumination has been held to the immediate necessity. The use of school buildings for afterschool or weekend activities has been restricted and tightly scheduled.

Within our budgetary capabilities, we have made repairs calculated to conserve heat. Very importantly, our students have been involved in the conservation of energy. Pollution of the environment, the treasure and the limits of our natural resources, and the conservation of energy have all been included in the curriculum. As a result of these efforts, the consumption of energy has decreased. Our school buildings do not use as many kilowatt hours of electricity, as many gallons of fuel oil, or as many cubic feet of gas as we did 2 or 3 years ago. But the budgetary line item amount for utilities has and is increasing steadily. This, of course, is due to the increased costs of energy. Thus heat and energy conservation in our schools has not yielded monetary dividends.

At this point, Senator, I would like to point out we are talking here in huge figures as far as the schools of Rhode Island are concerned. The engineers told us in the past 25 years that it cost about 1 gallon of fuel oil per square foot in a school building to heat that building for the year. In the average community, the elementary schools are approximately 50,000 square feet in size, and in the middle schools, junior high schools and high schools in this State the square footage in those buildings exceeds 100,000 square feet. Back in 1972–73 we were paying approximately between 12 and 15 cents per gallon for number 2 fuel oil. We are paying in excess of 36 cents a gallon for fuel oil today which is well over 100 percent increase in cost. Therefore, you can see we have 400 school buildings in this State, and if every school building, every community has between 400,000 and 500,000 square feet of school building within its community to be heated, a little arithmetic soon shows what Mayor Lynch and Mr. Creamer were testifying a while ago, that the bill for fuel oil in our schools is tremendous. In spite of the fact that we have conserved fuel oil in our schools, the increase in cost of the fuel oil has realized no monetary savings to the communities, and that is why our budgets for the 180 days for the children for this particular school year, for example, is in jeopardy. Home energy conservation is needed as much as possible.

There are close to 400 school buildings in use in the day-to-day operation of our schools. They vary in age and size and structural design. Many of them need structural and mechanical improvements if we are going to effectuate some real energy conservation to a point where we can level off the costs of oil, gas, and electricity. Some of our buildings need new roofs. High ceilings and antiquated lighting systems need changes. Inefficient heating systems need replacement. Windows and doors need to be changed or replaced. Some schools need zoning controls. Air systems need to be installed or replaced to conserve the heat within the building. These and other items represent capital-type expenditures which have been and are on the long-range plans of many school committees of the

State. But the economy of this State is still suffering seriously from inflation and unemployment compounded by the withdrawal of Navy activities back in 1973.

This is to say that neither the State nor the local property taxpayers can afford to undertake major capital improvements which most of the 400 school buildings in Rhode Island need now or in the long range if the limits of our natural fuels are to be safeguarded.

In conclusion, may I say that the superintendents of schools still continue to work with our teachers in a continuing effort to teach our children the source and meaning of our natural resources and appreciation of their finiteness. We also believe that there could well be a reorientation of the traditional school calendar year in the interest of fuel and energy conservation. We sincerely hope that the recommendations of the Subcommittee of Education will be followed, because there is no better use Federal funds could be made of in the interests of fuel conservation than to effectuate a 10 percent or more saving of the fuel in the 400 school buildings of Rhode Island and thousands of others throughout the Nation, and especially in the northeast.

Thank you, Senator Pell and members of your committee for your courtesy and attention.

Senator PELL. Thank you, Dr. Gaudet and Ms. Cole. Now I'd like to address one or two questions of a specific nature. We have, you say, approximately 400 school buildings in our State. How many of those have double windows?

Dr. GAUDET. I would dare say very few. I don't know the exact number, Senator.

Senator PELL. What would be the optimum temperature, the average temperature that is presently kept in those schools as compared with the temperature last year before the crisis?

Dr. GAUDET. I think you'll find the temperature in the school buildings currently closer to 65 degrees during the day, the school hours and lowered as far as possible, between 60 and 55 after school hours and weekends.

Senator PELL. What about last year, what would it have been?

Dr. GAUDET. Last year it might have been a little bit higher during the course of the school day. I would say possibly closer to 68.

Senator PELL. From the viewpoint of the health of the children and teachers, even if it was slightly below 65, would that have a dilatory effect on either their health or learning ability?

Dr. GAUDET. I think as far as the learning ability of the children is concerned, a temperature of 65 or lower would be perfectly all right, but the teaching ability of the teachers, at 65 or 60 they may suffer a little bit more.

Senator PELL. Maybe they'd have to wear gloves as well as sweaters.

Ms. COLE. I attended a [illegible] in Washington last week. There were two meetings. In one meeting room the temperature was very low, perhaps 60. I would say that I stayed in that room perhaps 15 minutes. It was really very, very cold, and then I went on to the next meeting. I would say perhaps because of maybe the location of the building, perhaps the way heat travels in a certain building, I would have to admit that I learned more at the second meeting than I did at the first, and I think that really says a lot for what is happening to our children as far as the learning process is concerned.

Senator PELL. Another question on this line concerns lighting. If, instead of using master switches, lights are controlled individually, then the amount of lighting that is used is only that amount which is really necessary. It is being found at office buildings that you can save the amount of electricity that you use by about 40 percent if you have no master switches and light is turned on and off by itself. How many schools in Rhode Island, I wonder, have no master switches and individually controlled lights.

Dr. GAUDET. Well, of course, as you know, a large number of spaces in any school are classrooms. The older buildings have one master switch. In the older building you press the button and you might get a couple of lights that would go on in the classroom or more possibly. But the modern buildings usually have a bank, three switches for one classroom and one bank of lights along the windows, one in the center and one on the corridor side of the classroom, so that you would probably have two, at least two switches in a modern classroom putting on the lights. In the corridors you have probably in most schools a master switch that lights all of the lights in the corridors at once and what we have had to do in some of our schools is to remove, actually remove the electric fixture of every second light, for instance, in corridors in order to make it possible to conserve energy in that manner.

Senator PELL. Returning to the classroom, in the average classroom, and obviously there probably is no such thing as an average classroom, but in the typical classroom there would be how many outlets for bulbs? Would you say 10, 15? You say there are three banks of light switches.

Dr. GAUDET. I think most of the modern classrooms are lighted by fluorescent fixtures and they are usually banked in 3-, 4-foot modules, perhaps three fixtures in a column: one here, one there, and there, and three columns like that in the classroom. You would conceivably have about nine fluorescent fixtures, approximately, each 4 feet or 3 feet long in the classroom.

Senator PELL. Wouldn't it be a good idea if each of those is lit individually so when there's enough light outside and you supplemented it you wouldn't have all nine going or three going? Isn't this a step that the schools could take themselves and could save quite a lot of money?

Dr. GAUDET. It would be wonderful, of course, if we could control lighting as we need it specifically, which we cannot do now in most modern buildings.

Senator PELL. This would be one step I know I've thought about and believe could be of help.

Another question: Are any of the schools in the State acquiring solar energy?

Dr. Gaudet. None I know of, Senator, none I know of. If we are going to conserve energy, and we are talking about school buildings, and when you talk about 400 public buildings which are schools in the State of Rhode Island, there are a tremendous number of buildings. Every building is at least 50,000 square feet, and the high schools and middle schools over 100,000 square feet. The homeowner should understand probably what a big building 100,000 to 150,000 square feet is to be heated. I think if we are going to conserve energy we must somehow or other be able to control and conserve. I'm sure your bill will make it possible for the people in this State to refurbish the school buildings, giving it a good roof so that we don't lose heat through the roof, giving us an air-conditioning system so that you don't evacuate all of the air in the building and then repeat a new supply, somehow save your heat this way and fix the windows, because many of our schools are almost 100-percent fenestration, which I suppose in modern times turns out to be a mistake, but we do lose a lot of heat.

There is a need, as you said a while ago, where you have that fenestration to put in some better windows, double windows or some kind of windows that would conserve heat. That's where we can save money on the heat, and I estimate that if our buildings could be efficiently designed and remodeled with the idea that we want to conserve the heat in the buildings, we could save at least 10 to 20 percent of the consumption of fuel in our schools, which in terms of 400 schools is a lot of saving.

Senator Pell. I would agree with you. Even this room where we are now has the volume of two or three houses. It's the same heating space, then, for just this single room.

Speaking of windows, fenestration, I like that word, speaking of fenestration, I'm always concerned by the fact some buildings are built so that you can't open the windows. When the weather is perfectly delightful out of doors you find either artificial air-conditioning going around circulating the air or one thing and another of an energy-consumptive nature. Do we have any schools in Rhode Island where you can't open the windows when the weather is lovely?

Dr. Gaudet. I'm not aware of any, Senator.

Ms. Cole. I am not.

Senator Pell. I'm delighted to hear that. I regret to say the U.S. Government is still building buildings at taxpayers' expense with windows that don't open. Therefore, you use up energy to keep the air circulating unnecessarily when the weather is fine out of doors.

Now, going back to solar heating, wouldn't it be possible in some of our schools to take and store on those roofs supplemental collectors, perhaps with young people helping to do some of the labor and the work?

Dr. Gaudet. Considering the fact that the roofs of most school buildings, modern school buildings are flat and there is a lot of roof there, for example, I would think that at least the physical space for the installation of solar radiation equipment, there would be the space to store such equipment because the roofs of most school buildings are very, very big.

Senator PELL. I would think some of the school committees might be interested in this as an idea. I know South County Hospital has done that with its new roof, put on collectors, that is. I would think some of the school committees, thinking ahead, might try to move in this direction and work out some arrangement. Perhaps the collectors could be installed by their own student bodies.

Ms. COLE. I would say there is no question but what school board members are making every investigation to investigate every possible method of conservation.

Senator PELL. We've touched on a few very simple ones right here, particularly the electric switch per outlet which could be very easily done. Now, what has been the result of the energy crisis in Rhode Island? Have any classes had to be terminated or activities curtailed in the last month or so?

Dr. GAUDET. In the last month or so?

Senator PELL. Yes.

Dr. GAUDET. I'm not aware of any changes which were made in any part of the educational program in the last month or so with the exception possibly of reducing the temperatures within the building to the absolute minimum. There would be a change possibly where if that was done, and it was done no doubt in many schools, that was for two reasons. We were aware that energy sources, fuel, was getting increasingly hard to get and, secondly, most school committees and superintendents are worried whether they are going to be able to pay their bill between now and June.

Senator PELL. Actually, we could be 7 degrees cooler than we are now and be perfectly comfortable in this room right here, I would think. Then returning to a point Ms. Cole raised, energy expenditures are basically considered to be fixed expenditures and not part of the discretionary expenses, is that correct?

Ms. COLE. No, I don't think I indicated that.

Senator PELL. I'm sorry.

Ms. COLE. I said maintenance is not a fixed charge. That's where the problem really is. Since it is not a fixed charge in a school budget, it seems to be the first item that school board members look at once they have to sit down and make cuts in those budgets. If they have not been approved as presented, then comes the difficulty, Senator Pell.

Senator PELL. I had it just in the reverse. In other words, energy expenditures are part of the discretionary expenses.

Ms. COLE. Exactly, yes, and that's really my very deep concern because I see it done over and over again.

Senator PELL. Thank you very much, Ms. Cole. Thank you very much, Dr. Gaudet, for being with us.

Dr. GAUDET. Thank you.

Ms. COLE. Thank you.

Senator PELL. The next witness is Mr. Edward McElroy, president of the Rhode Island Federation of Teachers. Mr. Ronald DiOrio, president of the sister group or brother group, is unable to be with us. Mr. McElroy will be speaking for teachers in Rhode Island.

STATEMENT OF EDWARD McELROY, PRESIDENT, RHODE ISLAND FEDERATION OF TEACHERS

Mr. McElroy. Good morning, Senator. We thank you on behalf of the Rhode Island Federation of Teachers for taking your time to listen to a topic which we believe is of vital concern not only to the school but to every sector of our economy, both public and private. I also want to extend my greetings to the students in the audience. You see firsthand an opportunity to find out how a bill actually gets all of the information that it needs before it becomes a law. I think that you'll find it's an interesting process.

Senator Pell. Incidentally, to interrupt for a minute, if any of you can't hear in the back of the room, wave your hand and we'll speak up louder here. If we don't see your hand waving, we'll presume you can hear.

Mr. McElroy. Senator Pell, the cold spell, especially the period just concluded, created a great difficulty for our schools as it did for most other public and commercial establishments. During this period as we have during the past few years, school employees have made many attempts to reduce the use and waste of energy sources within our schools. For a variety of reasons these efforts, though successful to a great degree, are not sufficient to make up for the increased cost of fuel. These increased costs have taxed sparse school budgets and have caused other areas of the budget to be cut. Very often money spent for heat was money previously spent for textbooks, supplies, and other needed materials for instruction. At present, the most pressing problems facing teachers during the period are the following:

In many of our buildings we have been forced to reduce the heat. Now this creates some problems, especially in the areas of kindergarten through 6. A question was asked before and the answer was that those most affected by it are the teachers, and I'm sure they are. As the bones get older in years we are less able I suppose to hold our heat.

Senator Pell. Well, you are not even wearing a sweater today.

Mr. McElroy. Well, I have what they call thick T-shirts. But nonetheless, what happens in the elementary school classes, especially kindergarten through 6 at least, we've noticed from our teachers that the reduced temperatures, especially when they fall below areas of 65 degrees, have caused problems in terms of the learning environment in the classroom. Very often, if you become fixed between two points, one being comfortable and the other being learning, more attention is put to being comfortable and less of the time is spent actually learning.

Now the second problem deals with the first because there is a difficulty, a great difficulty in our schools at present of adjusting the temperatures. What we have in many of our schools is one thermostat or one control, and in order to get the temperature at 65 degrees in the area of the furnace, we have ranges in the building going from somewhere around 50 degrees up to probably much higher than that in another area in order to get an average of 65 degrees. What we don't have are the proper controls and the proper zoning of heat in the building in order to control it to that specificity.

In the past few years, the Rhode Island Department of Education has been meeting with a group which has been called together to discuss the problems of energy, and I've served on that committee. Many of the problems noted in other sectors of the economy are also problems with schools. The great majority of the schools today were built for times when our concern about energy was not great although it should have been, and in all sectors of our economy we are today paying dearly for our lack of foresight.

One change has been made, Senator, just to allude to a question you asked of the previous panelist. I believe in the town of North Providence, just a day or two ago, the calendar was changed and the February vacation was extended from 1 week to 2 weeks, and 1 week would be added at the end of the school year to make up for that time.

Now these public officials are calling for changes in the calendar and I suppose I have to use North Providence as an example since it's the only one available. Those things have public relations value in terms of letting people know a problem exists, but in terms of actually meeting the problem of energy conservation they do little if anything. If you look at the number of degree-days you save by closing schools for 1 week and heating your schools only to that temperature that's necessary in order to not create other damages in the school, I don't think the degree-days in a school like that would exceed 200. I don't think the total saving would be anything significant in terms of a budget. So while it may have some public relations value, it certainly doesn't, in our mind, do anything in terms of improving conservation of energy.

Looking at the three aspects of 701, which is the bill we are dealing with today, I would hope that the first section of the bill, where we are talking about providing grants to educational institutions, would also include heating controls and zoning in buildings, changes of present buildings where one or two zones exist to create zones in buildings. For example, where large group instruction is going on, phys ed classes, cafeterias, and things like that, you can maintain a capture of a tremendous amount of body heat, and you could change controls in those so that the temperature in those parts of the building could be less than it is in any others where classroom instruction is going on, especially amongst the very young. I'd also hope that in terms of your demonstration projects besides dealing with demonstration or model programs about energy conservation that you'd also be dealing with alternative sources of energy, and I'm sure some of the good experiences which have taken place in Rhode Island recently with solar heat could also be used in terms of demonstration projects in the school.

Again I want to thank you for holding the hearing. I want to express to you our confidence that a bill such as this would certainly highlight the problems of energy not only in the schools but in all sectors of our economy, and I hope would work to make people not only more aware of conservation requirements but also to make them willing to work toward the goals of conserving our diminishing supplies of energy.

Senator PELL. Thank you. What in your view would be the minimum temperature that would be comfortable enough for teachers and students alike? What would be the lowest you'd like to see the thermometer? Speak in Fahrenheit.

Mr. McELROY. I couldn't speak Centigrade so you have one on me. If the temperature were controlled and we were dealing with a true temperature, I think around 65 degrees is not too little. I think it depends really on the age of the students that you are working with. If you are working with students such as the students you have here, junior high students, they're moving from class to class at the end of the periods and things like that that create some energy and some body heat, then it probably wouldn't be as important to keep it right on 65. Where you are dealing with smaller children in self-contained classrooms where they move in the classrooms but not so much movement in terms of class to class, things like that, I think probably anything less than 65 degrees we've found would be very, very difficult. It's easy enough to say everybody wear a sweater. I'm sure they should, in fact do. I think you can get used to 65 degrees. I know that just from personal experience. We've done that at home. When it was first turned down to 65, everybody thought they were being mistreated, but as the days go on, you get used to that temperature. Of course, it still feels warm when you come in from out of doors. I've heard, I don't know this, I've heard studies show that 62 degrees can be an acceptable temperature. I wouldn't want to see that, especially when we can't test it in terms of specific classrooms because we don't have the energy controls to be able to fine tune our temperatures that way. I was talking to someone the other day in a large commercial building, an older commercial building in the city of Providence who told me that if he can get his temperature within 12 degrees of what he sets it, then he's doing very, very well. This is a fellow who is responsible for heating plants, things like that. Twelve degrees seems like a lot of variance in terms of a thermostatic temperature as opposed to an actual temperature in the building. I'm sure that our problems in the public schools are not any different.

Senator PELL. Are there any other instances around the State besides North Providence that you can think of where there's been an impact upon teaching patterns and the learning patterns of the school inhabitants as a result of the bad weather?

Mr. McELROY. I think only very minor effects I've been made aware of. Most of the feedback we've gotten, Senator, has been from teachers of the very young, specifically from kindergarten through grade 3 where an awful lot of the activity in some of these classrooms is on the floor for example where they're working together in groups putting things together on the floor, things like that. There have been some changes necessitated as a result of reduced temperatures for those kinds of activities.

Senator Pell. In your schools with open classrooms as opposed to those with closed classrooms has it had a difference in impact?

Mr. McElroy. I don't think I could honestly answer that question. If Dom DiLuglio is in, Warwick has an open classroom from Drum Rock.

Mr. DiLuglio. Drum Rock School is a school that has very little fenestration, and it's a newer school. We have the kind of response to heat regulating controls Mr. McElroy speaks of, and so consequently we haven't had a problem with it.

Senator Pell. Thank you. I understand you'll be testifying later. We can pursue this at this time. Thank you, Mr. DiLuglio. Thank you very much, Mr. McElroy. It is always great to see you. Good luck and give my best to Mr. DiOrio.

Mr. McElroy. It's good to see you, too.

Senator Pell. Our next witness is Mrs. Mollie Decker, president of the Rhode Island Congress of Parents and Teachers.

STATEMENT OF MOLLIE C. DECKER, PRESIDENT, RHODE ISLAND CONGRESS OF PARENTS AND TEACHERS

Mrs. Decker. It's a pleasure, Senator Pell, to meet you. I met you in Washington a couple of years ago with the PTA National Conference of Legislation in your office, and I'd also like to say hello to your committee. I'm very pleased to represent Rhode Island Congress PTA. I'm Mollie Decker, the State president of Rhode Island Congress PTA.

We thank you for the opportunity to testify at this hearing today. Among our PTA objectives are these: to promote the welfare of children and youth in the home, school, church, and community and to secure adequate laws for the care and protection of children and youth. PTA can rightly be called a children's lobbyist. Children are our only concern. Their health and safety are uppermost in our minds. We believe that each individual should be taught to value this country's natural resources and instructed as to how these resources may be conserved and replenished. We have passed resolutions concerning this at national conventions in the years 1970, 1972, and 1974. Conservationists have been warning us the past 3 winters that fuel supplies, especially gas, were running dangerously low. This winter is being called the winter of the century by the National Weather Service. Record breaking cold, ice, and snow have snarled transportation, emptied unheated factories and schools and left mills shivering in near zero temperatures. Fuel supplies, especially natural gas are running critically low in many areas. President Carter has appealed to us to keep temperatures in our homes at 65 degrees during the day and 55 degrees at night to help spread our dwindling supply.

Surpluses in some sections of the country are being diverted to areas where the worst shortages exist. Schools in several States have been closed down for varying lengths of time, some for as long as 30 days to allow fuel to be used for home and health care facilities.

We in Rhode Island have not been faced with this as yet, but our concern is that education of the children will suffer because of these shutdowns. Local TV stations have shown pictures of schools with open windows in the middle of a cold spell. This seems to be a poor method of temperature control given the fuel situation. Quite often the problem seems to be in older buildings with outdated heating systems. Boilers are turned off over the weekends. Temperatures of 50 degrees on Monday morning have been reported. Children sit with their coats on. By afternoon it is too warm and windows are opened.

School department budgets barely provide necessities now. Zone heating in a building is costly to install and replacing of the old heating plants for more efficient ones are usually out of the question even though newer systems might conserve fuel. Moneys for this would have to come from other than local sources, but we might discover that better temperature control would lead to more efficient learning and better health.

Mollie Decker, Rhode Island Congress PTA. Thank you.

Senator PELL. Thank you very much, Mrs. Decker. Now you mentioned the problems over the Nation have been very bad as a result of this weather crisis, but in our own State what have been the deleterious effects on the schools and the school population?

Mrs. DECKER. I think that we have had some missed days as we all know. I have to say this first though. I was at a meeting last Wednesday that said New England had done a fine job, in fact the best in the country on conserving fuel. You perhaps know this. But with inflation, we are just about where we were before. We have done the finest job in the country as I understand it in fuel.

Senator PELL. That is correct. We in Rhode Island have done a good job as has already been pointed out. However, with the increasing costs, it's like being on a treadmill.

Mrs. DECKER. That is correct.

Senator PELL. I'm just wondering, though, of your reaction to this. What do you think is the ideal temperature, the coolest that's still adequate for health?

Mrs. DECKER. I would like to say, Senator Pell, thinking of the young, I think an average of between 65 and 68. Now I have been told from younger mothers that their homes are turned down in the evening to conserve and that some of the homes are being kept in that region of 65 to 68. We know young people certainly at this age can really stand the cold better than an older person can.

Senator PELL. I'm always struck by the fact when people from Europe come to America they are horrified at how hot it is in our houses and schools and buildings, compared to what it is in their own countries. They have the feeling it's not healthy. We get used to being at 68 or 70, and in fact it's more harm than good in the end. I'm curious as to what your reaction would be if we became used to being considerably cooler, 62, 65, in that range, whether we might not be healthier in the end provided we were dressed appropriately.

Mrs. DECKER. I agree with you. I think we Americans have been spoiled for a long time, and as you have just spoken upon, I think people in Europe live in much cooler or colder atmospheres and maybe we should strive as Americans in the interest of conserving energy to cut down and perhaps maybe we should learn to live with the 62 to 65. I agree with you, sir.

Senator PELL. Maybe we would even be healthier in the end. This is the question that comes up from travelers when they go back and forth.

Mrs. DECKER. But you have to start at a certain point and lead up to it. We have been spoiled. Although if you go back in history, way back we really didn't have many comforts way back, did we? So we're spoiled with the good things of life.

Senator PELL. It might be of interest to you to know that the temperature in this room at this time is 19½ degrees Centigrade which is 67 degrees Fahrenheit. I think we agree it's comfortable but we could be a little cooler and be perfectly comfortable.

Mrs. DECKER. I agree with you, and I'm sitting with two lovely gals from PTA who made the same statement a moment ago, and they thought it was a very comfortable temperature. Maybe we should strive for this, start. We have to anyway.

Senator PELL. I understand you may have a Pawtucket spokeswoman with you.

Mrs. DECKER. Yes, I do.

Senator PELL. Do you have her testimony? We'll enter that into the record.

Mrs. DECKER. I will give it to you.

Senator PELL. Thank you very much.

Mrs. DECKER. Thank you. It was a pleasure.

Senator PELL. Our next witness will be Dr. DiLuglio, Superintendent of Schools in Warwick. Welcome. I've been to your school several times and admired your work, and I'm very glad you are here.

STATEMENT OF DR. DOMENIC DILUGLIO, SUPERINTENDENT OF SCHOOLS, WARWICK, R.I.

Dr. DILUGLIO. Thank you very much, Senator. I'm very pleased to be here and appreciate the opportunity you've given us to come before you and your committee this morning to discuss some things we think are important in the crisis we have in saving schoolhouse energy. I want to thank you also for the help your staff has given me in research and in other matters associated with this problem.

The literature tells us schools in America consume 11 percent of all energy, used for heating and cooling purposes, in the Nation, and most school buildings in active service today are over 30 years old. Conservative estimates tell us that half of them are in need of major retrofitting which may achieve savings of from 30 to 60 percent. Rising energy costs are gobbling up the already limited revenue available to local school districts, and an immediate remedy provided by retrofitting could necessarily be achieved only at the expense of a drastic reduction in the educational effort.

In 1975 the American Association of School Administrators in polling superintendents of the Nation found they rated energy as their chief Federal concern. It's evident we need help.

The Warwick, R.I. school department's physical plant consists of 34 buildings, 26 of them ranging in age from 25 to 66 years. All of the schools within this age-bracket were built during times when initial costs of construction and maintenance were paramount, and concern for energy conservation was most remote. The past 7 years have changed the priority of emphasis and today this school district, is greatly concerned with the specter of rising costs of energy competing for the diminishing funds for educational needs. When the American Association of School Administrators launched their project for saving energy, we embraced its possibilities with open arms and asked that our district be considered for selection of a pilot school. Our records of school fuel consumption have been carefully kept over a 7 year span and our Scott Elementary School met the criteria: age, type of construction planned, continued use, and structural problems which contribute heavily to the use of energy. The Scott School was selected by the American Association of School Administrators as a pilot school for this area of the nation, and an architectural and engineering study was ordered. The study recommended the following changes: conversion of the heating system from gas to oil fired; repair of the roof and addition of insulation to same; a change in the operation of heater-ventilating units to reduce the amount of outside air drawn into the building. Up until last year State public health regulations provided that we introduce fresh air into the building. This meant we were heating air which was constantly being discharged. It's been illustrated since that time that this was done more for hygienic reasons rather than those of comfort and health.

Finally, the replacement, repair and adjustment of heating system components to insure efficient operation. The New England Innovation Group, which is staffed by a Government agency called the National Science Foundation, lent their support to the project and ran a thermographic study which graphically illustrated the areas of heat loss in this particular school. What they did was fly over the school, using infrared cameras, to take pictures of the school itself. The areas of heat loss were noted on negatives that are produced by such a study.

Our school committee, although desperate for funds, and ill-prepared to divert same, agreed to the AASA contract to do so in an amount equal to 10 percent of the cost of the project. The results of the study have just been released. The study estimates the following first year savings to be: Roof insulation, a savings of $2,795 with a pay back period of 7 years. The pay back period means that if we do the things they recommend we do with the roof of this building, we would save in the first year $2,795, and then we would recoup that expenditure in 7 years.

The replacement, repair, and adjustment of certain heating system components: A change perhaps in some components in the boiler, a change in heating controls which Mr. McElroy and Ms. Cole mentioned earlier, for a saving in the first year of $2,617 with a pay back period of 9 years, and the efficiency of operation of controls and changes in the thermostatic cycle, that is, the adjustment of control, the application and the use of new controls and their proper operation in the first year at no additional cost for a saving of $1,534.

The estimated total savings predicted would approach 60 percent. With the experience and information generated by this pilot project, this school department would be in a position to make similar modifications to its other plants with like expectancy for savings.

Funding for this project should provide three of the necessary ingredients for success:

First: Engineering and architectural expertise beyond that already engaged by LEA. It costs money to do the studies we need to have done in order to come up with the kinds of findings we've had in this pilot project. My colleagues, some of whom are here today, Joe Picano from the city of Cranston and school committee members represented by Ms. Cole, know that although we've been effecting considerable savings in use and utilization of energy in schoolhouses, increased costs of fuel and energy have negated the savings. In cases where the balance doesn't come out properly, we've had to divert moneys from other areas of the budget to provide for fuel which is, of course, a necessity, one of the costs that we just can't cut back on.

And so if we had this kind of engineering and architectural expertise in house, it would be very helpful to us. Also we need an assist in expenses for retrofitting. It's virtually impossible for us to dig out of our budgets the amount of money we need for us to do this, and effect the kind of savings we need in effect to carry out the concerns we have for the increase in energy use, we need money for retrofitting these buildings. An architectural and engineering bank of experts will tell us what to do and then we need the money to do it.

My third recommendation for a pilot project would be for in-house personnel that would help us to monitor the rising costs of energy and the costs of energy throughout the system. The three things I would recommend that the committee consider are helping LEA with engineering and architectural experts beyond that already engaged by LEA; expenses for retrofitting and in-house personnel for constant monitoring for energy conservation. I think I echo the sentiments of my colleagues nationwide. We have serious problems in stretching educational dollars to provide those programs ordinarily associated with good education. I don't want to belabor this. I think all of us are aware the educational dollar is shrinking. The energy situation thrust upon us finds us ill prepared to cope. We must cope in order for education to survive and you must help us lest we find ourselves with adequately heated buildings housing comfortable students whose opportunity to learn has been traded for funds to keep them warm.

Senator Pell. Thank you very much indeed, Mr. DiLuglio, for your testimony. Incidentally, the points you made, the necessity for expert advice, the retrofitting and then monitoring of some demonstration grants would all be provided for in this bill. Have you had a chance to study it?

Dr. DiLuglio. No, sir, I haven't. I'm awfully pleased to hear that, Senator.

Senator Pell. I'm delighted. This is a subject which has interested me for a long time. That's why I held a hearing on exactly this subject 3 years ago. At that time though I think the issue was premature. I've learned in my years in the Senate you can have a good idea but if it's too early it doesn't fly.

Now obviously the energy crisis is more in peoples' minds. The only problem is that we are a very emotional people, transitory in our emotions following that idea. I'm concerned if the weather suddenly improves this sense of pressure to move ahead in this field will be dissipated. That is what happened with the *Argo Merchant* where we were all so concerned about that oil spill off our shores 2 months ago, yet you don't find any great pressures building up now for increased legislation to handle these problems. We must react to crises when they come and take advantage of them. That's what we should do at this time.

Dr. DiLuglio. I agree.

Senator Pell. What actual benefits do you see that your model program is having for the rest of the State and country? Are you making your experiences known throughout the State and throughout the Nation?

Dr. DiLuglio. We're still in the planning stage. The project has not been funded to the point where we can make any of the changes. We've just finished with the architectural and engineering study. Part of the project and part of the agreement we have with the AASA is our exchange of information with other school departments and with the public. This school will be a demonstration school. We have agreed to allow people from all over the New England area to come visit the school and to supply them with records and other pertinent information so we can disseminate the information gathered by the project, to as wide a body as is possible.

Our school, will serve as a model project for New England. I think one of the reasons we were chosen over some others mentioned is our proximity to the airport and the ease with which people might come in and view it and get out the same day.

Senator Pell. How many school buildings do you have in Warwick?

Dr. DiLuglio. Counting buildings such as our administration building and buildings not used as schoolhouses, we have 34 of them, and 26 of them range in age from 25 to 66 years. So we have in some instances a fairly new plant, we have some buildings that are just 4 years old and others of them are a good deal older than that.

Senator Pell. In the model building that you are working on, the model project, do you have, for instance, separate light switches for each outlet or simple steps of this sort?

Dr. DiLuglio. Yes, sir, we do. In fact, we've taken those steps in most of our school buildings. It's not a new project. We've switched them around so that each bank is activated by an individual switch.

Senator Pell. That's great. Now, are you moving ahead with the idea of solar heat collectors?

Dr. DiLuglio. We haven't had success with that. We have a vocational-technical school which you may be aware of that has a carpentry and electrical course of study and we've gathered together all of the youngsters that are interested in the building trades and we've actually built four homes. That last home interestingly enough was built just for handicapped people, people who have difficulty walking, with a ramp and counter levels at specific heights, that sort of thing. We applied for a grant for the local power company to allow us to become involved in their program where we might use solar heat, but we were not successful in obtaining it. We're very interested in building a home using our own students in utilizing solar heat, and I've been in contact with Robert Foust from your staff who has given me some interesting leads on how we might go about this.

Senator Pell. Would it be interesting to you to have solar heat collectors installed on any of your other buildings perhaps with some of the younger people in the school helping in the installation?

Dr. DiLuglio. I'm not sure we could undertake a project of that size, I am not sure if it's feasible. I certainly think it's something we would be very interested in studying, and if it is feasible, certainly to engage in it.

Senator Pell. What is the temperature you've tried to keep your classrooms at? What do you consider optimum?

Dr. DiLuglio. We've ordered all rooms to be kept at 65.

Senator Pell. What is your view with regard to if they were kept at 62 or 63. Would that have a deleterious effect if the students and teachers were on notice about it to add adequate clothing?

Dr. DiLuglio. Well, I have some different feelings on that. I've enjoyed the out of doors all of my life, for example I'm a duck hunter.

Senator Pell. It's pretty chilly out there.

Dr. DiLuglio. Yes, sir, it is, particularly this past winter, it's very chilly. I think if you condition yourself and dress properly, there is no question that you can work comfortably in temperatures that hover around 60. I am not sure I would have courage enough to make that an edict in our schools, but I agree with Molly Decker, I think we can move toward that line and not injure the health of our people. Now I have some strong feelings about efficiency and cold. There was a very well respected Marine commander, General Lewis Burwell Puller, who lead our Marines in Korea. He was very concerned with how well the Koreans coped with cold while Americans were not able to do so. He made a statement at one time to the effect that he was afraid that we might become a nation of healthy, comfortable, best dressed, best equipped soldiers to ever lose a war. I'm concerned that maybe we have indulged ourselves to where we are used to being so comfortable that we don't realize we could be less comfortable and get used to being less comfortable, and become better and to learn from it.

Senator Pell. I think you are right, we have tended to become a little soft. I've always felt that school transportation is a problem. What happens is that youngsters learn not to walk. What is the custom in Warwick, how far does a child have to live from the school before you have to bus him?

Dr. DiLuglio. Our senior high school students walk 2 miles; junior high students 1¾ miles, and then we break it down into varying distances, kindergarten students, a half a mile, intermediates three quarters of a mile and 1 mile.

Senator Pell. I think that's hardier than the national average and I congratulate you on that. I think many other districts would have much shorter distances, which is not good for the youngsters.

We've got a lot of young people here. I might be interested in getting a reaction from them as to what they think the ideal temperature is. I'd ask all of you in the audience, you are about nine-tenths of the audience to figure out how warm you are right now in here. Listen to me and don't look at the camera. How comfortable do you think this room is? Would you be comfortable if you were a few degrees cooler or would you rather a few degrees warmer, bearing in mind you can wear a sweater. Now, how many like the way it is? How many would like it cooler? How many would like it warmer? You have three choices. First, how many like the way it is, show your hands? [There was a show of hands.] How many would like it warmer? [There was a show of hands.] How many would like it cooler? [There was a show of hands.] That's about even. That's very interesting. In fact, a few more hands were up for cooler than warmer. I think this bears out what Mr. DiLuglio and I have been saying here. I thank you very much indeed. I remember General Puller. I never served under him. I admired him very much indeed.

Our next panel is led by Dr. Schmidt, commissioner of education for our State accompanied by Mary Lyons, regent on the board of regents and Augustine Capotosto, also a regent. Dr. Schmidt, welcome. I think you are here without escorts. I gather the regents are not with you.

Dr. Schmidt. Miss Lyons is coming but she isn't here yet.

Senator Pell. Should we wait until she comes? I thought you'd come together.

Dr. Schmidt. I know she's planning on coming.

Senator Pell. Do you have the time to wait a moment?

Dr. Schmidt. I certainly do.

Senator Pell. I think Dr. Peterson is here as the next witness. Maybe if you could just sit here for a moment.

Dr. Schmidt. Fine.

Senator Pell. Dr. Peterson I understand is here, president of Providence College. We are very honored Dr. Peterson would take the time to come. I would ask him if he would come forward and speak for the private colleges of higher education.

STATEMENT OF REV. THOMAS R. PETERSON, PRESIDENT, PROVIDENCE COLLEGE, PROVIDENCE, R.I.

Reverend Peterson. Good morning, Senator. I'm very pleased to be here.

Senator Pell. I'm very interested in your views as to the impact the energy crisis has had on Providence College, what it has meant to your institution and what it has meant to all of the institutions of higher education in the State.

Reverend Peterson. There are really three areas that are impacted almost immediately by this energy crisis. One is financial; another relates to maintaining the health of the faculty and student body, and the third relates to a morale question. As far as the morale problem is concerned, if buildings are inadequately heated and the situation becomes quite uncomfortable, certainly a morale problem develops. All of us have been asked to make sacrifices in order to preserve energy. I think that most people are willing to do this. It's been my experience amongst students, and faculty, and staff, even at times when the buildings were not properly heated because the thermostats were deliberately turned down, seemed willing to put up with that in order to do what is necessary to maintain energy. At times it does create a morale problem.

As far as the health situation is concerned, it's a little different in trying to heat properly a dormitory and heat properly a home where you have 170, or perhaps even more, students living in one building where doors are constantly being opened and closed. It's very difficult to set thermostats and maintain constant temperatures. The thermostats in dorms were set usually between 68 and 70 degrees. They were lowered at the request of the President and at the request of the local authorities to 65. Once again, I think the good will of the students has been remarkable and they were willing to put up with this. If there is an outbreak of flu or other type sickness, then certainly having buildings inadequately heated presents a real health problem. So far, we've been very fortunate in that area. Once again, the good will of the people on the campus has been remarkable, but nevertheless we have to be conscious of the need to maintain the good health of those who are at the college.

The third area of impact is that of finance, and perhaps the best way of stating it is a rather dramatic statement but, nonetheless, it is completely true. Between 1973 and 1977, the cost of energy at Providence College rose by 425 percent. During these years, there was a 12-percent increase in energy consumption. This was brought about mainly by the fact Providence College, as you know, has acquired the Chapin Hospital property and five new buildings. All of the buildings on the Chapin property were tied into our heating plant but the five are actually used as follows: two as dorms, one as an office building, one as a fine arts center, and one a multiree building.

The addition of these buildings was the reason for the increase in energy consumption. Between last year and this year, there was a 12-percent increase in the cost of energy. This was for fuel, no. 6 heating oil. The cost of electricity went up about 10 percent over the past year. So while the energy consumption has been maintained, and, indeed, outside of the addition of the Chapin property has been cut back, the costs have skyrocketed. This, of course, makes it extremely difficult to make it within the confines of the dollar budget.

We are looking for an oil well on the campus. So far, our scientists haven't found it.

Senator PELL. Short of finding an oil well on the campus, I hope you educate a future John D. Rockefeller.

Reverend PETERSON. I think that would help.

Senator PELL. In connection with the steps you are taking on campus, you may have heard some of the discussion we had about, for instance, separate light switches, double windows, and things of that sort. What specific steps have you taken in the last year or so with the coming of this crisis?

Reverend PETERSON. If I could outline just a few, then I have copies of the formal statement I was requested to bring.

Senator PELL. Thank you.

Reverend PETERSON. During the last year, new timeclocks for controlling heat were added to most of the buildings; new heating zone controls were installed; new heating cycles were instituted; hot water provisions were reduced wherever possible; hot water temperatures were lowered; thermostat settings were lowered; improved boiler efficiency was brought about by the addition of new equipment; all of the windows in two of the buildings, in Joseph and Steven Halls were replaced. Storm windows were installed in certain areas as an experiment where there was particular need. A reduction was made in the operation of exhaust fans. Lighting was reduced or eliminated in a few areas. Changes were made in fluorescent lighting, installing fluorescent lights which used less energy than incandescent lights. Ventilation or fan operations were minimized. Special personnel were assigned to monitor lights, extinguish lights where possible. A new energy commission at the college was established in order to see how further cutbacks could be used and brought about.

Senator PELL. What would be the savings not in cost, because with increasing prices cost is just like a treadmill. What has been the savings in fuel consumption as a result of these measures?

Reverend PETERSON. About 12 percent, between 10 and 12 percent was the saving.

Senator PELL. Do you believe you can go further in these directions and save more? I heard somewhere the figure this morning, I think it was 20 percent, somewhere in there, or even 25 percent.

Reverend PETERSON. Well, once again, the percentage is influenced by these new buildings we have put in that we have now utilized. I think probably further cutbacks can be made in this energy consumption. I don't think we have any voice, really, nationally, because we are told that the fuel supply is simply not there, that if we are to look to the eighties and nineties for necessary fuel, then we'll have to conserve now. The case of Iowa is a good case in point where people foresaw a difficult winter and began really last spring preparing for it by cutback in consumption of energy in various sources and as a result they have sufficient to get them through the winter.

Senator PELL. From my viewpoint, what can the Federal Government do to be of help? Do you have any suggestions?

Reverend PETERSON. Well, they could help us find the oil well on the campus at PC. No, I think certainly the impact which everyone finds is the financial impact, and anything that might be done in that area certainly would be of assistance, either in some kind of a subsidy or whatever other matter might be thought proper. One suggestion I noted has been made is a tax incentive, a tax cutback, tax relief in terms of the energy shortage, but that really doesn't help the private sector, some of the private sectors of higher education, or private education, because, as tax-exempt institutions, that would have no impact at all upon our budget.

Senator PELL. Thank you very much. Have you curtailed any of your activities or rearranged your schedules as a result of this cold winter?

Reverend PETERSON. Not dramatically. The suggestion has been made to take all of the holidays and to rearrange the calendar so that we would have the month of January free. However, realistically, that doesn't work because if you take all of the holidays and put them in at one time, as you get into the long, gray days of February and March things get a bit restless. I think the students and the faculty also need some time off periodically, and so it becomes unrealistic to try to give long periods of time off and then no vacations off at all for the rest of the year.

Senator PELL. Hasn't this been done in the institutions in the northern tier? I'm thinking of Bennington College specifically.

Reverend PETERSON. Yes, it has. The other suggestion has been made to perhaps stay open longer into the summer months. As the time goes along, certainly these considerations will have to be taken into account.

Senator PELL. Do any of your sister institutions have similar or any difficult problems other than those you've mentioned yourself?

Reverend PETERSON. There is an organization, as you know, the Rhode Island Higher Education Council, that is made up of the presidents of all of the colleges and universities of the State. We get together on a regular basis. The common problem is the financial one, the impact it has had upon the budgets. The cost of energy skyrocketed and goes higher and higher rapidly and it becomes more and more difficult to handle this with contingency funds. All of us have tried to cut back on the use of energy. The suggestion was made during the fuel crisis a few years ago to close for 2 weeks, something like that. Some places actually did, but, by and large, there seems to be no great emphasis on closing institutions for long periods. During the regular vacation time, such as Christmas or the winter vacations, the buildings are maintained at only maintenance level, usually about 50 degrees, and that certainly is a significant saving. But there is no discussion right now to close the schools for any long periods of time.

Senator PELL. Are your buildings built so that all of your windows can open? This matter of fixed windows has attracted my attention since it is one of the many ways in which we have come to waste energy.

Reverend PETERSON. That's true. That was one of the reasons why we spent about $85,000 to replace the windows in two of the old buildings. The windows were in excellent condition but the windows were in disrepair. So we replaced all of them with windows that were very flexible and could be utilized either way.

Senator PELL. Thank you very much, Father Peterson, for taking the time to be with us. Your statements will appear in full in the record.

Reverend PETERSON. On behalf of the higher education community, Senator, we'd like to thank you for your constant interest and concern in education and for your constant availability to us with problems that we have. We appreciate your concern very much.

Senator PELL. Thank you. I look forward to continuing to be of whatever help I can. Thank you.

The final witness panel today will be Dr. Schmidt, commissioner of education, accompanied by Mary Lyons, one of his most active regents. Welcome, Dr. Schmidt, and welcome, Miss Lyons.

Dr. SCHMIDT. Senator Pell, we are here as a team looking at all education, from womb to tomb, and Miss Lyons is particularly going to be talking about the situation in higher education and I will be looking at some of the elements in the elementary and secondary levels, as well as some more general statements. Would you prefer if she began?

Senator PELL. Whatever way you would like. Since we are going from womb to tomb, we ought to start with elementary education first, but whatever way you would like.

STATEMENT OF DR. THOMAS C. SCHMIDT, RHODE ISLAND COMMISSIONER OF EDUCATION, ACCOMPANIED BY MARY P. LYONS, MEMBER, RHODE ISLAND STATE BOARD OF REGENTS, CHAIRMAN, SUBCOMMITTEE ON POST SECONDARY EDUCATION

Dr. SCHMIDT. Mr. Chairman, I am Thomas C. Schmidt, Rhode Island Commissioner of Education. As the commissioner of education, I act as the chief executive for the Rhode Island Board of Regents and represent the State's public school systems and the public postsecondary institutions.

Mr. Chairman, I truly appreciate the opportunity I have to appear before this subcommittee today to support a legislative effort which could lead toward the establishment of programs needed to increase the efforts in energy conservation needed throughout this Nation's elementary, secondary, and postsecondary institutions. These kind of problems are not new to us. We have lived through extraordinary changes in the last several years, and education has felt them as strongly as any other sector of our population. I believe that there is a significant need for the Federal Government to provide incentives and funds so that the educational institutions of this State and our country can begin to plan and implement long-range energy conservation activities which would include new curriculum and energy conservation and develop efficient heating facilities through renovations. We are highly dependent upon petroleum, and natural gas, and coal, and this year we've witnessed a dwindling of our natural gas reserve to the point that the loss has created emergency situations unparalleled in the history of this country.

The vast majority of fuel users in the United States depend on natural gas for their heating needs. Here in Rhode Island, we have not been as adversely affected by the natural gas curtailment since the primary fuel used by business, industry, and consumers is petroleum. This could create a false impression to those leaders and citizens evaluating fuel needs. The Northeast has a unique potential for greater energy shortage than the rest of the Nation for two reasons. Our major fuel is petroleum, and petroleum production in the United States has continued to fall after more and more domestic oilfields are depleted. The dependence of this Nation on foreign oil increases daily. In fact, during the spring of 1976 the Nation imported more foreign oil than it produced.

It is my assumption an additional burden will be placed on the Northeast due to this national dependency on foreign oil. Over 70 percent of the oil consumed in Rhode Island is foreign oil, and it is imported primarily from Venezuela. As the Nation's dependency on imported oil increases, the reallocation of that oil to different parts of the country can only create critical shortages in this region. This shortage will be reflected in our school plants. A recent survey of Rhode Island's school districts indicates that 72 percent of all our school buildings use oil as their primary source of heat. A much smaller percentage, 15 percent, use natural gas, followed by 5 percent using electricity.

I think we still have 11 buildings using coal. These two factors create an immediate need to face reality as to the future outlook of fuel depletions and that relation to education. We, in the educational community of Rhode Island, have begun to address the basic issues of energy conservation. Presently, my agency has renewed the activities of a statewide energy task force in an attempt to establish long-range programs for the development of ongoing energy conservation practices. Represented on this task force are educational leaders from elementary and secondary schools, private and public postsecondary institutions, members of the governor's staff, staff from this agency, and representatives of our major utility companies. Their task is not an easy one. It was relatively easy for this task force to provide guidelines and basic strategies for energy conservation. Conversations I've had with school leaders and decisionmakers have indicated their willingness to adopt these strategies and put them into motion. However, conservation measures, such as turning down thermostats and practicing better energy conservation procedures lends minimal savings when the entire fuel problem is considered.

I recently conducted a survey of the schools in Rhode Island and found the following: Close to 50 percent of all the school buildings in this State were constructed prior to 1930. Seventy-five percent of the buildings were constructed prior to 1960. What this means is we have facilities with 18 foot ceilings, wooden, drafty windows, boilers over 40 to 50 years old, facilities with lack of any kind of insulation, no zone heating, and roofs which not only leak heat energy but sometimes snow and cold as well.

Most important is to implement the Federal Energy Administration's guidelines for making facilities energy efficient. These two include concepts of quick fix, refit, and system conversion.

The problem we have here, Mr. Chairman, is not one of willingness and desirability but one of finances. All of us have noted the trend in the last 5 years of this Nation's citizens rejecting bond issues relating to school construction and renovation, and cost factors, reflected in tax rates, make capital development unacceptable to our already hard-pressed citizens.

Here in Rhode Island, we are witnessing financial problems occurring in many of our school systems. When faced with budget cuts and restrictions, one of the first areas which receives the red ink in any budget year is that of maintenance and facilities improvement. If this trend continues, and it seems to be, then some form of fiscal assistance outside of local governments has to be found. I think that the Federal Government must provide this fiscal response. I understand that your bill would provide funds through incentive grants with a matching requirement, and this is truly a needed first step toward meeting our needs. A new influx of dollars will aid us greatly in assisting to make our schools energy efficient.

May I respectfully point out, however, although school program, including renovation, are a local responsibility, and the fiscal burden should be primarily that of the district, that the matching requirement recommended by your bill may negate the intent of your legislation. As I mentioned earlier, education is already forced with physical crisis and I fear that the additional new dollars, despite the fact that they will be matched with Federal dollars, may be too much to bear and would lead to necessary energy conservation measures being by-passed.

Beyond this reservation, I support the advantages of renovating schools to conserve energy. We know from a recent program conducted in Schenectady, N.Y., which eliminated 88 percent of glass areas in a school, incorporated lower ceilings, put in 6 inches of insulation above and increased weather-proofing, changed the oil consumption in a year of a school from 170,000 gallons to 99,000 gallons. This is a saying of 41 percent in the oil consumption. The dollar savings to the community was over $22,000. This amounted to a savings to the taxpayers in that district of approximately $1.50 per thousand on their assessment evaluation.

Mr. Chairman, we in Rhode Island would like to emulate this activity taken by our neighbor in many of our schools. However, we need new funds to undertake such a program. Our costs are escalating and the need is more and more apparent. A Federal Energy Administration survey with a representative sampling of 498 school districts indicated that the median school district in the country paid $29.77 per pupil for fuel in 1974 and 1975, up from $9.70 from 1972 and 1973. This increase of $20 per student was despite an actual consumption drop of 3 percent due to energy conservation methods.

Here in the Northeast, our fuel costs increased between 126 percent and 136 percent per pupil over the same period of time. This happened even though there were sacrifices of some of our comforts by reducing the thermostats and lowering our consumption from 8 to 15 percent. This compares to a cost of $184.00 per student in postsecondary institutions in 1973 and 1974, a significantly higher figure.

Information relative to energy efficiency is difficult to obtain and the amount of data available is limited. The reason for this is lack of funds once again.

Mr. Chairman, any program which allocates funds for renovation of facilities and does not provide additional funds to measure and evaluate the effectiveness of those programs may not be valuable in the long run. It is my understanding that your bill would also provide funds to allow the educational community the opportunity to obtain technical assistance and increase their staffs with specialists in energy conservation. I support your intent in this area. We need to generate data on a monthly basis and increase the collection and analysis of existing activities so relevant. Also, I feel it just as important that as any data is collected, that we collectively strive for uniform methods of evaluation.

The last item of concern I have is to question the need to place sums of money for demonstration projects. Presently, various organizations including FEA have spent considerable sums for demonstration projects. Perhaps we should evaluate those projects, measure their worth and establish models to be followed with the funds that would be authorized for demonstration.

The comments mentioned in this statement indicate a need for new influx of dollars and we look to the Federal Government.

Once again, we admire and appreciate the leadership which you are exhibiting to the citizens of Rhode Island and the country through the introduction of this bill. The amount of individuals involved as students in all levels of education, elementary and secondary, continuing education and postsecondary programs has increased significantly. When one considers the amount of time our citizens spend outside of their homes in educational facilities, we realize that true energy conservation in those buildings can lead to significant decreases in fuel consumption. Higher education facilities now consume 3 percent of our Nation's fuel.

One last comment. It is my hope that the Congress not limit itself to addressing possible solutions to energy efficiency in education to programs directly related to education. The Congress is now placing renewed emphasis on job bills, manpower bills, CETA programs They could consider placing a high priority in those bills, energy-related projects.

Just a month ago, the school districts and public colleges of Rhode Island submitted over $45 million worth of public works proposals to the Secretary of Commerce. Of significance was the fact that the majority of the projects were not for new school buildings or new additions to those buildings, but for renovations of buildings, ceilings, roofs, et cetera, all of which leads to energy conservation and efficiency.

This is a vivid example of why it is important that the Congress strive, not only through the educational authorizations such as yours, but in all Federal programs for assistance in these areas.

Mr. Chairman, I think the above statements broadly indicate Rhode Island's needs. I think they indicate our intent and need to bring together renewed efforts to preserve our energy resources. The board of regents and Rhode Island's school districts strongly support any educational measures which would assist the local school districts undertake most expensive yet necessary enterprise. We stand ready at any time to assist you in your efforts and support your efforts. Thank you.

Senator PELL. Thank you very much, Dr. Schmidt. Maybe Miss Lyons would care to make her statement now. We can discuss both statements afterward.

Miss LYONS. Mr. Chairman and members of the subcommittee. I am Mary P. Lyons, a member of the Rhode Island State Board of Regents and chairman of the subcommittee on post secondary education. Today I represent the regents in addressing your proposed legislation as it affects the public institutions of higher education in this State—namely, the University of Rhode Island, Rhode Island College, and Rhode Island Junior College.

In discussing the impact of escalating energy costs on education, it is helpful to focus on higher education because it represents unique problems, and, here in Rhode Island, unique solutions.

The unique problems are apparent when one contrasts the energy cost per postsecondary student with the energy cost per elementary-secondary student. As the commissioner cited in his statement, the national figures obtained by the Rhode Island Department of Education show that in the 1972–73 academic year, energy cost per student, grades 1 through 12 was $9.90. However, the postsecondary cost was over 10 times that amount—$103 per student. In 1973–74, the costs increased dramatically to $29 per elementary-secondary student and $184 per postsecondary student. Updated figures most recently will show a further increase in energy cost per student, with a significantly higher cost for students beyond grade 12.

Colleges and universities, of course, have far more expansive physical plants than elementary and high schools and provide more extensive facilities—student unions, theaters, laboratories, residences, and the like. However, a campus is a learning center, and moneys deferred to maintaining it are moneys deferred from educational activities. However, in Rhode Island, you will be pleased to know the University of Rhode Island, Rhode Island Junior College, and Rhode Island College have been able to keep that sort of deferral at a minimum. Through foresight and quick response, the respective administrators of these institutions have in place effective energy conservation plans which have enabled them to reduce consumption, improve energy systems, budget realistically and stay reasonably within their budgets.

The task has offered a varying degree of challenge to the three institutions. For Rhode Island Junior College, with its two new all electric facilities, the task has been relatively simple, but effective. Both the Knight and the Blackstone Valley campuses installed at the time of construction the Honeywell Delta 2000 Energy Management System. This system, which controls temperatures by zones, has enabled both campuses to use energy at a level beyond the architects' estimate of normal projected yearly energy usage.

In March, 1976, Rhode Island College also installed a Honeywell Delta 2000 System, costing $220,000 and funded by the 1975 educational bond referendum. In the first 5 months of the 1976–77 year, the college realized an 18.6 percent decrease in energy produced compared to degree days. The oldest buildings on the Mt. Pleasant campus are nearly 20 years of age. The newest building opened 1 year ago. This campus, therefore, is in relatively good condition. Nevertheless, the installation of the Honeywell system required the complete rebuilding of all heating, ventilating and air conditioning systems to put them in good working order. For the last 3 years, incidentally, the college has implemented a low- or no-cost energy savings plan which includes reassigning classrooms, eliminating excessive lighting, and weatherstripping doors and windows. These minor economies realized a 25.4 percent decrease of energy produced as compared with degree days when they were first implemented in 1974–75.

The most difficult challenge has been faced by the University of Rhode Island, with its many buildings, diverse in age, size, and condition, spread out over four locations. As a result of a very ambitious program, the university reported on December 1, 1976 that over the past 5 years energy consumption decreased 25 percent, while energy costs more than doubled. Without the energy program, the costs would have tripled, at least.

Like its sister institutions, the university has undertaken no- and low-cost conservation measures. However, to realize major energy savings, the university has had to undertake several expensive projects. Since 75 percent of the Kingston campus is heated by a central steam plant, the correcting of the antiquated water system was essential. That project, now nearly completed, cost $719,000—financed half by a special State referendum and half by title X. In addition, the university has installed a new boiler, new valves, manholes, and insulated pipes at a cost of $947,000, financed through the 1970–72 and 1975 educational bond referenda.

The $1 million renovation of the University of Rhode Island extension building in Providence has included insulation and the installation of weathertight windows. And considerable adjustments have been made in the design of the new nursing facilities, currently under construction in Kingston, making it the first URI building specifically designed with attention to energy conservation.

Rhode Island public postsecondary education has not been devastated by the increasing intensity of the energy crisis. However, that fact should not suggest that a bill such as you propose may be unnecessary. On the contrary, the relatively efficient physical facilities of the University of Rhode Island, Rhode Island College, and Rhode Island Junior College indicate that only through careful energy planning and management can current budgets support high quality education. We are free from the threat of closings; we are not diverting large amounts of money from educational programs to support wasteful energy systems. We represent, in all modesty, something like the goal other higher education institutions, with the aid you propose can obtain.

Rhode Island College, the University of Rhode Island, and Rhode Island Junior College do, therefore, relate very closely to your bill. One of your proposals is for demonstration models. Rather than create new models, you may find it useful to use Rhode Island postsecondary institutions as models already in place. In fact, the university is already using its recent experience with energy conservation to help local Rhode Island school districts set up their own energy conservation programs.

Rhode Island public higher education is certainly not functioning under optimum energy conditions, but we have benefited by foresight, careful planning and investment of resources which otherwise would have been applied to other needs of the institutions. Another aspect of your bill, the proposed matching grant, speaks to incentive. Responding to incentive is praiseworthy. However, using one's initiative is even more deserving of praise. I respectfully suggest that Rhode Island public higher education institutions, because they took the initiative, should not be excluded from the financial assistance your bill proposes. Perhaps you could consider a means of rewarding institutions like ours by reimbursing the funds they have diverted to and invested in energy conservation, for example, or by funding them as demonstration projects.

In concluding, I thoroughly endorse the intent of your bill. Public higher education cannot absorb increased costs indefinitely without a significant reduction in the quality of education itself. Thank you.

Senator PELL. Thank you very much indeed, Dr. Schmidt and Miss Lyons for your statements. I'm curious. Why would there be such a huge difference between the amounts of money spent per capita to heat students in general education as opposed to higher education? It's a ratio of almost 10 to 1, more than 10 to 1. What was the reason for that?

Miss LYONS. The figures as given to me and as I came to understand them include the entire cost of supporting a student on a campus.

Senator PELL. Gym heating, swimming pool heating and so on?

Miss LYONS. Yes; and residential heating.

Senator PELL. It still seems surprising because you double the heating for residential, I can see doing that. Yet you increase it by tenfold. It seems quite extraordinary. Are those national figures or statewide?

Miss LYONS. National.

Senator PELL. Would you think they are correct in Rhode Island?

Miss LYONS. I have only the national figures. If you just think of it, perhaps you'd find some underlying figures for that trend at the University of Rhode Island more so than at the junior college which has for the most part cases are self-contained campuses.

Senator PELL. Have you made any projections in the department of education, Dr. Schmidt, with regard to the long-range energy crisis, looking ahead next year, 1978, 1979, and 1980?

Dr. SCHMIDT. Nothing of a sophisticated nature except as the testimony indicated many of these schools are very marginal at this moment in terms of support. We know from looking just at the State aid figures alone which are calculated where the districts are spending their money, that for the last several years these districts have been borrowing heavily against the future by dipping into their maintenance accounts. This will in turn become tragic not only as they have to put more money in to bring it up to necessary grade level to keep the buildings together but it doesn't let them keep ahead of the game to be able to do anything about retrofitting or any way of, as this building has, putting in aluminum windows and tightening things up. The long-range projection, positing the fact our economy is not going to grow and get healthy quickly in this State, is gloomy because we are living off of borrowed money and borrowed time as far as our general maintenance is concerned.

Senator PELL. In view of the fact that with fewer births occurring the number of children in school will be less in 5 or 10 years than now, in your long-range projections have you thought of closing any of the less practical school buildings?

Dr. SCHMIDT. Yes; we have, and 2 years ago the general assembly passed an act requiring that my department review all new school construction or renovation of a size necessary to require a bond issue just to that very end, to look for efficiencies. My recommendations go to the board and the board scrutinizes these very carefully to look for several things: (1) whether the enrollment projections bear out any needs for increased buildings or renovation; and (2) whether schools could be closed or even more importantly whether schools in one district that might be crowded might use another district that is not crowded.

Senator PELL. That reminds me of the Thibeault Commission report which caused fireworks a few years ago yet had a great deal of merit to it. I noticed a number of school buildings we have is 395 as of today. If we could look into a crystal ball with the present population projections, what number of buildings, no matter whether they're new or old, what number of buildings would you imagine Rhode Island would have for educating our children in say 10 years?

Dr. SCHMIDT. I can't translate our population projections which I see in a curve which looks like Mount Everest because it peaks and drops so quickly. I can't translate that number of children into number of buildings because I don't know how they are disbursed at what ages. I would suspect there could be as much as a 10 percent drop in number of buildings thinking about the drop in population over this time.

Senator PELL. There may not be a drop in our own State population. There is not projected to be one, but as I understand it there is a projection, about a 10 percent or an 8 percent drop in the school age population if my recollection is correct.

Dr. SCHMIDT. That is correct.

Senator PELL. Has the Federal Government been of any help to you in this energy crisis?

Dr. SCHMIDT. Yes, it has.

Senator PELL. In what way?

Dr. Schmidt. In one level, and that is through the title X program, the Department of Commerce through the Department of Education regent grants to employ people who have been out of work. We have been able in the postsecondary field and in the elementary secondary field to use a proportion of that money for renovations. This has been particularly true in two areas, one in the vocational schools where we have been able to go back and do much needed renovational work, and again in the postsecondary field where in the building which I have my office and the University of Rhode Island has its extension division they have coordinated the title X program of the Federal Government and local bond issues to completely redo and retrofit that building.

Senator Pell. That's the old Brown and Sharpe Building, is it?

Dr. Schmidt. No; it was the Henry Barnard School.

Senator Pell. Yes; the Henry Barnard Building is in back.

Dr. Schmidt. Yes; this is behind. The other area we've received help in, and I can't be precise about it, but I understand that we have received NASA overflight infrared pictures of the State which have been useful in pinpointing energy leaks in some of the buildings and technical assistance from the Federal Government in this area.

Senator Pell. What percentage of the State education budget has been consumed, or is consumed by energy costs and what has been the increase in very rough terms?

Dr. Schmidt. I can't answer that, but I can get that information to you.

Senator Pell. Could you submit it for the record?

Dr. Schmidt. Certainly.

Senator Pell. I would think it would be quite high, maybe 20 percent or 15 percent for energy. I'd be interested in the increase. Can you state what the Government can provide local educational agencies in additional needs to keep with the energy crisis?

Dr. Schmidt. We can provide some technical assistance as Miss Lyons has indicated through the University of Rhode Island. It's been very helpful. We can coordinate with district superintendents and others, a coordinated approach to savings which is very useful but we cannot address the major problem which is the problem of dollars for retrofitting. That's terribly important in this State with over 50 percent of our school buildings being so old.

Senator Pell. If the crisis continues, will this result in a further increase in tuition in our institutions of higher learning?

Miss Lyons. We have to deal with all of the costs. In some cases the auxiliary enterprises are self-supporting, and that would be realized just in increasing the fees, for example, student union fees for dormitories, things of that nature. But we have to figure out what kinds of income we have and what our expenses are and in the very long run it would have an influence on tuition.

Senator Pell. In the past I have noticed, I am sure both of you have in many institutions and in many schools and colleges, that as a general rule in the past one has felt uncomfortably hot. That presumably is no longer the case, but what do you think is the coolest that young people can study in and be comfortable provided they have adequate notice?

Miss Lyons. Well, the public schools have all set their thermostats to 65.

Senator Pell. My question is could they be comfortable at 62 provided they knew about it and had on sweaters. Can we make do with lower temperatures.

Miss Lyons. The undergraduates, they could adjust, yes, I would imagine.

Senator Pell. What would be your thought?

Dr. Schmidt. This is a completely nonscientific answer. My daughter is currently studying at Oxford. She says they turn the heat on once every 2 weeks, and we're still getting letters from her regularly, and she's getting Bs, and that's my unscientific answer to the question.

Senator Pell. I went to school once in Europe, too, and I remember the temperatures were much cooler there than they ever were here. So I think that we have further room to improve in this direction provided there is adequate notice and the youngsters have a chance to be accustomed to it, provided they're adequately clothed, and so forth.

Dr. Schmidt. My father went to a school in Baltimore, Md. I would say in the early part of this century, and they decided learning would be accelerated if there were no creature comforts, and they were dressed in bags and given a warm brick and there were no windows. They sat in a room such as this with no heat, no windows through the Baltimore winters and he graduated and went to college and is still living at the age of 84. So I guess we can survive almost anything. He doesn't look back on that period of his life with a great deal of pleasure, however.

Miss Lyons. I'd like to stress what has already been done. Not only have the thermostats been gradually been set back, but the college in particular has tried to reassign classes around areas so they are not heating empty classrooms between classes. They have tried to consolidate the classes, and also to the point Father Peterson was discussing when I came in. Although this wasn't done to meet the energy needs, it has the effect. Most of our State schools now do not have full schedules of classes during the month of January. We finish the semester prior to December. We begin again in the very last part of January and hold intersessions in very centrally located parts of the campus. That, I would imagine, would have an impact on what we've been doing. That was not the intention of doing so, but it has had the effects.

Senator Pell. I thank you both very much indeed, Miss Lyons and Dr. Schmidt. This brings us twoard the end of this hearing. I think we've heard a lot of good ideas and good suggestions. It seems to be the consensus that one could have the thermostats or temperature set even cooler yet, and that there are individual measures that we could take advantage of to save more energy. I recall the hearing I held January 3 years ago on exactly the same subject. That hearing really put down the groundwork for the legislation I've introduced here. But at that point there was no serious interest in the topic whatsoever. I would hope that because of the current crisis there would be more interest in moving ahead and that we won't have to wait another 3 years to enjoy a surge of interest in this direction.

The record will stay open for another 2 weeks for any additional statements offered, and at this point unless anybody else in the audience wants to make a statement?

STATEMENT OF MR. GOYETTE, PAWTUCKET, R.I.

Mr. GOYETTE. I would just like to add a comment or two that Mr. Creamer made concerning the Pawtucket school system. Senator, I heard you mention three items which I would like to comment on for specific schools in the city of Pawtucket. One you mentioned was solar heat. We just opened a brand-new junior high school in Pawtucket during the month of December. At that time it seems that the Federal Government was granting some moneys for experimental purposes with solar heat. Our achitects, Robinson, Green and Beretta did apply for a $50,000 grant for this school as it would have been a model school and an experiment to try to save energy. We were turned down. The grant we sought was for $50,000. Now, this is a brand-new junior high school. It is in its sixth week of operation. Insofar as square footage is concerned, it has 111,000 square feet. It is heated by gas. It is of the latest construction. Our heating bill for the first month is $5,100.

You talked about windows. We installed in one of our elementary schools brand-new windows, the best that could be obtained at a cost of $125,000 last year. Yet, that school needs a whole new heating system renovation. Recently, on a cold day they set the temperatures at 65. In one room in the building, the warmest of the whole building was 67. The coldest was 47. That is an extreme which for young people at the elementary school level I do not believe is comfortable enough to carry on activities.

So you see, with heating controls that do not work properly or control the temperature we would want throughout the building, sometimes we may have rooms that are 80, some that may be 60 and 65. I'm trying to think of a third item that you mentioned.

The renovation of heating systems: We presented to the board of regents our request for the next 5 years, particularly for next year. We in Pawtucket have 16 school buildings. Six of those are less than 20 years of age. The others, this is one of them, need new heating control systems or renovations to heating systems. One of them, the school where we put up $125,000 of bond money for windows, we are seeking $40,000 to renew the heating system. Of note is that last year in the city of Pawtucket we sought an annual amount of $250,000 in bond money. It was the first time in the history of our city that school bonds were turned down, which shows the general feeling I think that is prevalent throughout the country when it comes to bond moneys for renovation of schools. Thank you.

Senator PELL. Thank you, Mr. Goyette, very much indeed. That is one part that I have seen very clearly today. Obviously, one step here would be to spend money on changes in the control systems.

Are you moving in that direction?

Mr. Goyette. There is only one control for the whole school. The whole thing needs to be renovated and replaced. That is one of our near future projects as soon as we have moneys to do so.

Senator Pell. Thank you.

STATEMENT OF JOSEPH PICANO, SUPERINTENDENT OF SCHOOLS, CRANSTON, R.I.

Mr. Picano. I am Joseph Picano, Superintendent of Schools in Cranston, R.I. Senator, I think that you certainly have come to a conclusion timely with your legislation. As I hear all of the comments this morning, we have tried to administer all of those ideas that can be used efficiently to cut down consumption of energy. We are at a point now we have done those things which can be accommodated within the local educational setting. The portion that is also of interest to me is we have been referring to those older buildings 25 years and beyond. We went through a rash of construction in the early fifties which would be put into this category, but not what we call old schools. We built many schools with a tremendous amount of glass. One of the problems I'd like to suggest is that possibly we look at these buildings which are not in the category of those real old buildings for some research. Our community spent $25,000 or is in the process of spending this to try to control solar buildup. Our buildings are totally uncomfortable when you get to 80 degrees and beyond, and I believe you visited one of the buildings a while back. So I'd like to just for another point of view suggest that we have another problem, and that is, through the construction of these buildings dealing with adequate use of electrical energy when we get to the spring and summer season.

A little survey we did a while back when we were studying a continuous school year indicated that the heat was more discomfort to the students than a little bit cut in temperature. So I'd ask you to consider the other end also.

Senator Pell. I appreciate that. You may notice we touched on it a couple of times. The days when it is really too hot so that windows are open in the schools are pretty rare, are they not?

Mr. Picano. Yes, except even with the windows open or closed, at a particular time of the year, and I'm referring to May and June, it has no appreciable affect. My concern is that we find a way to do this which is an energy loss which hasn't been mentioned as much today. I think an appropriate piece of activity should be generated to this.

Senator Pell. That's certainly true on a national level because 4 percent of our energy expenditure in this country is spent on keeping America cool, for air conditioning. The other 96 percent is spent for keeping America warm, for moving America and fueling its plants. Those are the rough statistics. I thank you very much indeed.

STATEMENT OF ROBERT A. COX, DIRECTOR, NEW ENGLAND INNOVATION GROUP

Mr. Cox. My name is Robert A. Cox, director of the New England Innovation Group. We are a National Science Foundation—RANN, Department of Commerce funded organization for public technology which originated here in Rhode Island. During our organizational period we introduced infrared technology as a device for studying excess heat loss and the means for correcting it. I have a short statement I'll file with the committee. The important thing for the committee to understand is that NEIG would like to demonstrate how science and technology can be made useful to the owners of publicly owned structures. Rhode Island has an opportunity to be in the driver's seat on this type of a project because the effort was initiated here although NEIG has performed similar work in other parts of New England. NEIG is a cooperative effort. We have scientists and political leaders trying to come to grips with this kind of task. We shortly expect—within 24 to 48 hours—the announcement of our National Science Foundation—RANN grant which will include a small amount of seed money to be given to retrofitting publicly-owned structures. We invite the schools and educational communities of this State to make their needs known to us. Thank you.

Senator Pell. Thank you very much indeed. I appreciate your comments and your statement will appear in the record. Are there any others who wish to speak? If not, this hearing is adjourned. We'll make what use we can of the information we have derived. I thank you very much for your participation.

At this point I order printed all statements of those who could not attend and other pertinent material submitted for the record.

[The material referred to follows:]

NEW ENGLAND INNOVATION GROUP

POLICY DEVELOPMENT COMMITTEE
Chairman
Hon. Vincent A. Cianci, Jr.
Mayor
Providence, Rhode Island
Vice Chairman
William R. Murphy
Selectman
Chelmsford, Mass.

39 PIKE STREET
PROVIDENCE, RHODE ISLAND 02903
401-272-3437
[illegible]

April 1, 1977

Mr. Donald Elisburg
General Counsel
Committee on Labor and Public Welfare
United States Senate
Room 4230
Dirksen Senate Office Building
Washington, D.C. 20510

Dear Mr. Elisburg:

Enclosed is another copy of my February 14, 1977 statement to the Education Subcommittee of the Senate Committee on Human Resources at its hearing held at Goff Junior High, Pawtucket, Rhode Island. I have made some minor changes in the transcript of my verbal remarks. I am sorry this material was not returned as promptly as possible but we were awaiting a Report on our Excess Heat Loss Survey of the Harold Scott School in Warwick, Rhode Island. A copy of that Report is included with this correspondence and I hope will be incorporated as part of my statement.

The New England Innovation Group has placed top priority on helping this six-State Region carry out significant energy conservation activities. Our Policy Development Committee has benefited from the expert advice and participation of Dr. Andrew Assur from the Army's Cold Regions Research and Engineering Laboratory and William J. Jones from MIT's Energy Laboratory. If your Committee has not already done so, I would recommend you consult these two men on the practical applications of science and technology to the problems of achieving energy efficiency in our public and private buildings and industrial processes. Enclosed is a copy of a letter from Dr. Assur which I think the Committee will find of interest.

NEIG is an active partner with the RANN Program at the National Science Foundation and I know Dr. Eggers and his colleagues would be delighted to share with the Committee the results of their work in the energy conservation field. Similiarly, the U.S. Department of Commerce has much to contribute concerning the commercialization of technology for energy conservation purposes. If you have not already benefited from these various resources within the Department of Commerce, NEIG would be delighted to arrange a meeting with the several people who have been of assistance to us.

One of the more intensive excess heat loss surveys of publicly-owned buildings in New England was initiated by George Roberts, Speaker of the

Mr. Donald Elisburg
April 1, 1977
Page 2

New Hampshire House of Representatives. NEIG served as the "technology broker" and the technical work was performed by the Army's Cold Regions Lab. I will see that a copy of the New Hampshire Report is made available to your Committee.

All of this evidence I hope will help convince the Senate that infrared thermography should be an integral component of any national energy conservation policy.

The New England Innovation Group is available at any time to assist the Committee in the development of this important legislation.

Sincerely,

Robt A. Cox

Robert A. Cox

RAC:LE

cc: Senator Chaiborne Pell
Senator John H. Chafee
Senator Thomas J. McIntyre
Senator John A. Durkin
Secretary Juanita Kreps
Dr. Alfred Eggers, NSF-RANN
Mayor Vincent A. Cianci
Mayor Dennis M. Lynch
Speaker George Roberts.

CRREL

EXCESS HEAT LOSS STUDY OF THE HAROLD F. SCOTT SCHOOL WARWICK, RHODE ISLAND

Richard H. Munis and Paul E.J. Vogel

March 1977

CORPS OF ENGINEERS, U.S. ARMY
COLD REGIONS RESEARCH AND ENGINEERING LABORATORY
HANOVER, NEW HAMPSHIRE

[illegible]

EXCESS HEAT LOSS STUDY OF THE HAROLD F. SCOTT SCHOOL, WARWICK, RHODE ISLAND

Richard H. Munis and Paul E.J. Vogel

INTRODUCTION

On 17 November 1976, a heat loss survey to pinpoint excessive heat losses was made of the Harold F. Scott School in Warwick, Rhode Island. Two thermographers, Dr. Richard H. Munis of the U.S. Army Cold Regions Research and Engineering Laboratory (CRREL), and Mr. Paul E.J. Vogel of the U.S. Army Materials and Mechanics Research Center (AMMRC) performed the survey using an AGA Thermovision infrared camera system. Following the heat loss survey a walk-through inspection was made of the building. The combination of data from the heat loss survey and the walk-through inspection was used to make recommendations for corrective actions which will greatly improve the thermal efficiency of the building.

The use of infrared thermography to locate insulation deficiencies in new and existing buildings is the application of a relatively new technology to a very serious recurring situation which began with the Arab oil embargo of 1974. Mr. Robert Cox, Director of the New England Innovation Group and one of the first public administrators to recognize the potential of infrared thermography to identify excess heat loss in publicly owned buildings, is responsible for directing and coordinating this project.

PRINCIPLES OF AN INFRARED CAMERA SYSTEM

Infrared thermography uses an infrared scanner or camera system to detect the heat that is radiated from a building. The camera, using a lens transparent only to heat, converts the heat into an electrical signal. This signal is then displayed on a TV-type screen as a "heat picture" of the building. The picture on the screen is composed of various shadings which range from white to black. Light zones on the screen correspond to warm surface temperatures on the building. Dark zones correspond to cooler building temperatures.

The heat picture that appears on the TV-type screen can be photographed with a Polaroid or conventional camera. This photograph, called a thermogram, can then be analyzed to determine locations of excess heat loss from a building.

ANALYSIS

The Harold F. Scott School is of an unusual design consisting of the original structure (built in 1965) which is a 14-sided polygon and the later addition (built in 1968) which is hexagonal. Figure 1 shows a segment of the addition which faces west. Figure 2 shows the front entrance of the building with the tripod-mounted infrared camera system in the foreground.

Twenty-eight thermograms were taken of the roof and walls of the multisided building with the AGA Thermovision infrared camera system. Most of the thermograms were taken of the wall sections at a distance of approximately 30 ft from the building.

Figure 3 shows a photograph of two typical wall sections of this building. Approximately 80% of these two north-facing walls consists of single-pane glass. Figure 4 shows a thermogram of one of these walls. The heat loss from the two windows on the right is somewhat less than that from the two windows on the left because drapes were drawn at the time of the survey. Note the bright zone (arrows) below the two left windows. This indicates heat loss through the asbestos board panels which are located under all the windows in the building.

Figure 5 is a thermogram of the auditorium roof and wall sections which rise above the main roof. The arrow points to the heat escaping through the three vents in the wall.

Figure 1. West-facing section of new addition.

Figure 2. Main entrance with tripod-mounted infrared camera system in foreground.

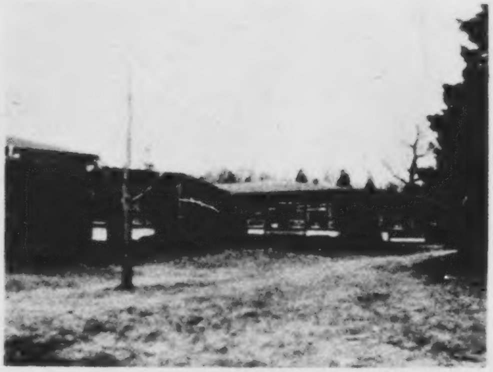


Figure 3. Typical wall section.

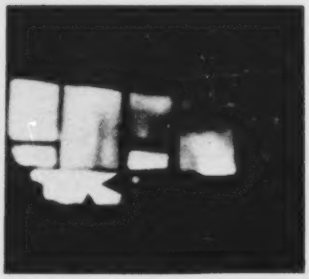


Figure 4. Arrows point to heat escaping through asbestos board panel under windows.

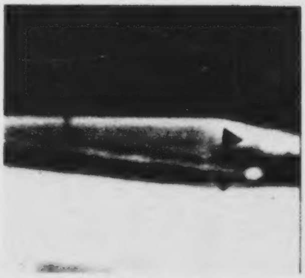


Figure 5. Arrow points to heat escaping through open vents.

Figure 6 shows a thermogram of another typical wall section in the new addition. The two arrows on the left point to a dark zone which extends underneath all four windows, instead of under only two of the windows as is shown by the arrow on the right. This suggests an abnormal situation since the dark zone should correspond only with the metal intake vents under the windows and not with the asbestos board panels. On our walk-through inspection we found the interior temperature in the room with the large dark area under its windows to be quite cool relative to the other rooms. The air handling units in that room were bringing in outside air, but the air was not being warmed by the heating coils.

Figure 7 shows a closeup thermogram of a construction joint where the steel header beam above the windows meets the brick buttress. The bright area in this thermogram (arrows) is an indication of the heat leaking around the steel beam. This heat leakage occurs around the steel beams at every wall-roof joint at each

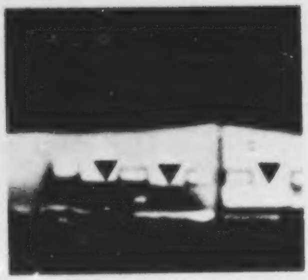


Figure 6. Arrows point to locations of cold air intakes and asbestos board panels under windows.

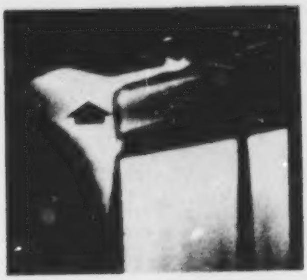


Figure 7. Arrows point to heat escaping around steel header beam above window.

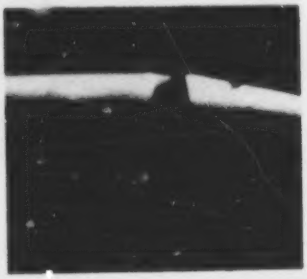


Figure 8. Bright zones indicate heat loss under and through steel beams.

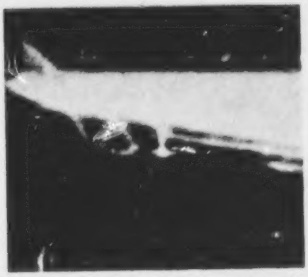


Figure 9. White stripes indicate conduction loss through steel rafters.

of the 22 wall sections of the building. Figure 8 shows a thermogram of one of the few walls without windows in the old section of the building. The bright white zones are an indication of heat loss through and under the steel header beams.

A new technique was used to view the unusually shaped roof of the school. Normally, a number of roofs of buildings would be surveyed at the same time (for the sake of economy) from a rotary or fixed-wing aircraft. In this instance, good interdepartmental cooperation in the city provided the use of the fire department's aerial tower. This particular apparatus is a maneuverable bucket and telescoping boom assembly – the bucket being large enough to accommodate two men comfortably – mounted on the familiar long ladder truck chassis. To provide an optimum field of view, the bucket was elevated about 25 ft above the roof. From this vantage point the entire roof was scanned except for a few parts that were out of view.

The most obvious source of heat loss for the roof occurred in the process of conduction through the steel rafters in both the raised cupola section and the lower main roof (see Fig. 9). It is believed that some stressing phenomenon may have caused the roof to become somewhat porous over the rafters and allow moisture to infiltrate along these lines and thus enhance heat leakage. This theory is supported by the fact that random areas of heat leakage were noticed on slopes and valleys of the roof (see Fig. 10). This is indicative of water entry and puddling. The puddle

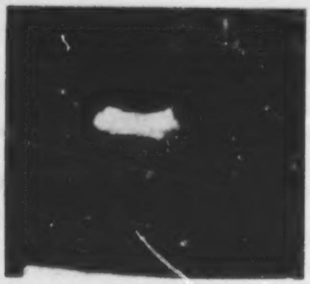


Figure 10. Bright patch indicates presence of subsurface moisture.

may occur some distance from the point of entry, but wherever there is water under the roofing material, the sheathing, insulation or other subsurface material that is wetted becomes a good conductor and a detectable heat leak. No effort was made to correlate the random areas of heat leakage to internal observations. However, during our walk-through inspection we were apprised of various locations of water leakage through the ceiling.

It is widely believed that the major heat loss from most buildings is through the roof because warm air rises. Since the total roof area of this building is over 30,000 ft^2 while the total wall area is only about 4,000 ft^2, it might be assumed that the major heat loss occurs only through the roof. However, it should be noted that about 50% of the total wall area is single-pane glass that has an R factor of about 0.9 as opposed to the roof which, as we understand, has an R factor of about 5. Since the temperature gradient between inside air and outside air is largest at the source of heat under the windows, this means that the glass heat loss could be almost as large as the roof loss even though the total glass area is only about 6% of the total roof area. Also, the R factor of the roof may have been substantially higher than 5 due to the large air space which exists between the roof and the dropped ceiling.

RECOMMENDATIONS

Interior temperature readings taken during the survey indicated a difference of about 16 F between the warmest and coolest rooms. On our walk-through inspection of the building, we saw that some of the valves controlling the flow of hot water to the convectors were inoperative due to mineral corrosion from the water supply. Therefore, we would recommend that as a first step the water be treated so that corrosion can be minimized, and that all faulty valves be replaced to ensure a controllable flow of heat from the convectors. If this is not done immediately, there will be a tendency to open windows during the cold weather to reduce high interior temperatures in those rooms having valves which cannot be shut off. This will, of course, be extremely wasteful of the natural gas used to heat the school.

Since our thermal inspection of the roof indicated many pockets of subsurface moisture which generated leaks at various locations in the building, it would seem that the entire building is a prime candidate for a new roof. At the time of re-roofing, various approaches should be considered to thermally isolate the steel beams to reduce the conduction heat loss observed in Figure 9. Possibly the conduction can be minimized by applying sprayed-on thermal insulation to the beams. However, use of 2-in. rigid insulation would minimize both convective and conduction losses.

A seemingly straightforward approach to reducing heat loss through the glass would be to add another removable glazing to the stop that is located on existing nonopening windows at about a distance of 1½-in. inside the existing glazing. By doing this, heat losses through the glass could be reduced by about 50% at rather minimal expense. However, it is our understanding that, with the problem of the existing windows being broken by vandalism, this type of solution could become quite costly since the inside windows might also be broken. Therefore we would recommend that serious consideration be given to permanently covering many of the present windows (e.g. in boiler room and in north-facing classrooms) with an exterior insulation finish system, even though the initial cost would be much greater than addition of an extra glazing. This would not only provide superior insulating quality to the wall but would also eliminate costly window replacement caused by vandalism.

Another major source of heat loss is through and around the steel header beams which support the roof rafters. The uncomfortable cold drafts generated at these locations could be prevented by blowing insulation into the voids of all the concrete blocks which support these beams. Also fiberglass insulation could be packed between beams that intersect at sharp angles and leave large gaps. The beams themselves could be covered with 1 in. of rigid insulation (e.g. Styrofoam) and then boxed in for the sake of attractiveness.

During our thermographic inspection of the building (which took place during the evening) we found all auditorium vents open and exhausting considerable amounts of heat. We understand that the purpose of these vents is to move moisture and stale air out of the building. However, it is questionable whether these vents have to be open when the school is not occupied. Therefore we would recommend that serious consideration be given to experimenting with closing these vents at night and on weekends to see if a reduced air change volume would be satisfactory.

ACKNOWLEDGEMENTS

We wish to thank Mr. Frank Zannini, Director, Buildings and Grounds, Warwick School Department, for his cooperation throughout the project. Also, we wish to thank the Warwick Fire Department, which kindly donated the use of their aerial platform so that a thermographic inspection of the school roof could be made.

NEW ENGLAND INNOVATION GROUP

POLICY DEVELOPMENT COMMITTEE
Chairman
Hon. Vincent A. Cianci, Jr.
Mayor
Providence, Rhode Island
Vice Chairman
[illegible]
Selectman
Chelmsford, Mass.

[illegible] PIKE STREET
PROVIDENCE, RHODE ISLAND [illegible]
401 277-3437
[illegible]

STATEMENT SUBMITTED TO THE EDUCATION SUBCOMMITTEE
OF THE SENATE COMMITTEE ON LABOR AND PUBLIC WELFARE
GOFF JUNIOR HIGH, PAWTUCKET, RHODE ISLAND
February 14, 1977

The New England Innovation Group is a six-state science and technology program initiated in September, 1975, by the Rhode Island League of Cities and Towns in conjunction with the Naval Underwater Systems Center and the U.S. Department of Commerce Office of Minority Business Enterprise with the support of the National Science Foundation. (See Attachment A for the members of NEIG's Policy Development Committee and a summary of its objectives, planning phase accomplishments and proposed first program year activities).

Energy conservation in publicly-owned buildings has been a major interest and technology utilization activity with NEIG since its inception. Joseph McDevitt, Executive Director of the Rhode Island League of Cities and Towns and NEIG's Municipal Advisor, first identified the pending financial and political crises which would result from an increase in energy costs or a shortage in supply. Unfortunately, the Winter of 1976-77 has made Mr. McDevitt's concerns a reality for school administrators, public housing managers and the operators of other publicly-owned facilities.

NEIG attempted to respond to Mr. McDevitt's warnings by organizing and conducting in March and April, 1976 an excess heat loss survey utilizing infrared remote sensing technology. This project was endorsed by Mr. Sirrouko Howard, HUD Area Director in Providence, the New England Federal Regional Council and the State Energy Offices of Connecticut, Massachusetts and Rhode Island. Over thirty sites in these three States were surveyed with infrared equipment attached to fixed-wing and rotor aircraft. The cost of these flights was supported by the National Science Foundation's Intergovernmental Science and Public Technology Program. Unfortunately, no other federal or state funds were then available to analyze this data and it was only in December, 1976 that NEIG was able to begin this critical work. Obviously, without an analysis of the data, school administrators and other operators of publicly-owned buildings could not take advantage of information which would help them decide what might be the most cost-effective means for achieving energy efficiency. Federal financial assistance is needed to make thermography and related services available to local and state governments.

Statement Submitted to the Education Subcommittee
of the Senate Committee on Labor and Public Welfare

Through the cooperation and financial support secured by George Roberts, Speaker of the New Hampshire House of Representatives, NEIC was able to continue its energy conservation work by initiating a detailed on-site excess heat loss survey of ten selected State office buildings in Concord, New Hampshire. The professional expertise for this demonstration project was furnished by the Army's Cold Regions Research and Engineering Lab in Hanover, New Hampshire and the Army Materials and Mechanics Research Center in Watertown, Massachusetts. The results of this work are still being analyzed but the preliminary findings were shared with NEIC's Policy Development Committee on February 11, 1977.

In November, 1976, NEIC assisted the Warwick, Rhode Island School Superintendent by arranging for an indepth infrared excess heat loss survey of that City's Harold Scott School. This facility is one of ten across the country included in the Saving Schoolhouse Energy Project being administered by the American Association of School Administrators. A lack of funds at all levels of government to support these types of technical services has been compounded by the lack of qualified personnel in the private sector to conduct this type of demonstration. NEIC was able to overcome these obstacles by securing the participation of the U.S. Army Labs in Hanover, New Hampshire and Watertown, Massachusetts. These Department of Defense Research Centers are members of the Federal Laboratory Consortium. Their contribution of equipment and personnel made possible an important demonstration of the value of thermography as an analytical tool for identifying excess heat loss. (See Attachment B for the Providence Journal story about this demonstration).

The results from the projects undertaken by NEIC clearly demonstrate that infrared thermography can be a valuable and cost-effective technical tool in any energy conservation program. Dr. Andrew Assur, Chief Scientist of the Army's Cold Regions Lab and William Jones, from MIT's Energy Lab, both endorsed the further development and application of this technology for energy conservation purposes at NEIC's Policy Development Committee meeting on February 11. Unfortunately, local and state governments are ill-equipped to utilize this valuable technology without federal assistance or the guidance of qualified personnel. It is NEIC's intention to see that these financial and personnel resources are made available as quickly as possible to New England's six states and over 1,500 local governments.

NEIC has pursued two objectives in its energy conservation work. The first is to advance the state of development of thermography as a tool in excess heat loss identification. The second is to help organize an "energy management industry" which will result in new job and business opportunities throughout New England and other "cold" areas of our country. Identifying and correcting building and heating system deficiencies in publicly-owned structures could be the basis for organizing this new industry. Equally important, NEIC hopes its work will begin to shift the allocation of scarce public resources from wasteful energy consumption to those services needed to build and maintain the minds and bodies of our citizens.

4

cc: Hon. Vincent A. Cianci, Jr.
Sel. William R. Murphy
National Science Found.
U.S. Dept. Commerce/OMBE
Hon. Dennis Lynch
Cold Regions Res. & Eng. Lab.
Army Mat. & Mech. Res. Ctr.

DEPARTMENT OF THE ARMY (603) 643-3200
U.S. ARMY COLD REGIONS RESEARCH AND ENGINEERING LABORATORY
HANOVER, NEW HAMPSHIRE 03755

CRREL-CS

1 March 1977

Mr. Robert A. Cox
Director
New England Innovation Group
39 Pike Street
Providence Rhode Island 02903

Dear Bob,

Some time ago you gave the Cold Regions Research and Engineering Laboratory an opportunity to demonstrate some techniques for locating sources of excessive heat losses from the Warwick School in Rhode Island. This was done by means of thermography, a technology initially developed by the military for detection purposes, and successfully transferred to civilian needs. Unfortunately, only a little time could be devoted to the Rhode Island case but the valuable results added to our portfolio of needed test cases.

As you have seen, a thermographic image has the appearance of an x-ray picture; it seems to show the interior of a wall. In reality, the detection equipment respons to photons (energy) emitted by the outermost layer of the wall. This process is extremely revealing of internal irregularities and flaws in the wall. It responds in the critical wavelengths due to surface temperature conditions where most of the heat conduction, and therefore heat loss can be detected. The images respond readily to temperature changes in the outer "skin" of the wall. Wind and radiation affect the results. Therefore, such surveys are best made during calm cold nights, with a sufficient temperature difference across the wall. The method also readily detects other heat leaks due to escape of warm air.

Although the results are largely qualitative, with some patience, we can obtain quantitative results. Together with other methods, such as determination of window efficiency, one can quickly determine where a small investment in construction changes can result in the best improvement of the thermal efficiency of a building.

1801 N. Moore Street, Arlington, Virginia 22209 703/528-0700

1 March 1977

CRREL-CS
Mr. Robert A. Cox

At the time of the Rhode Island survey nobody suspected that a very cold winter was about to hit the nation. You asked what my thoughts are on the situation.

Some simple calculations quickly reveal the magnitude of the savings that can be achieved nation-wide by a modest effort. According to the Federal Energy Administration (NY Times, 77-II-26) last winter's home heating bill for the nation was about $13 billion. This may jump to $18 or $19 billion this winter depending upon weather during the end of the heating season. It is not unreasonable to expect about $15 billion annually (ignoring inflation) for the winters to come. According to Herbert Stein, former chairman of the Council of Economic Advisors, consequential damages due to lack of fuel shortages also caused $8 billion consequential damages, largely in loss of income due to layoffs.

More fuel at the source is not the answer if the distribution system cannot adjust (as was the case this winter). One must conserve at the point of consumption. Most experts agree that energy conservation is a much quicker and effective answer to our energy crisis.

To many people conservation implies discomfort and they would much rather have more energy, produced by any, even the most exotic means and at whatever cost. This is not prudent and certainly not necessary. A surprising amount of energy can be saved without loss in comfort, by detecting heat losses and taking constructive steps to eliminate these losses.

It is easy to save 10% of fuel without loss of comfort by fairly simple measures. For the entire nation this would amount to $1.5 billion annually. An investment of 1% of this amount or $15 million in a research and educational effort would provide a tremendous leverage to alleviate the situation.

However, it is also quite possible to achieve a 30% reduction in fuel consumption. The effort would be increasingly more difficult. A change in habits would be necessary and some discomfort would result. The public would have to be taught to build better insulated and tighter houses for a small additional investment. Adjustments in living patterns may be called for. If we are not prepared we may be forced into it. Nation-wide, we are talking about a saving of $4.5 billion annually or 409 million barrels of imported fuel. Two percent of the savings for a single year alone invested in research and education or $90 million would carry us a long way toward achieving this goal.

It is imperative to mobilize available professional human resources wherever they may be located. The cost is not high, especially since the professionals are being paid from other sources anyway. All that is required is a change in direction and priorities. (We are talking about a minuscule 0.40% of Federal R&D or 0.21% of the national R&D effort). Research is not expensive if compared with actual losses and potential benefits. But it must be applied where it counts the most.

I did not even consider the consequential damages, Mr. Stein was talking about. Assuming that all houses had been well engineered we would have saved about $5.6 billion in fuel and would have avoided at least another $6.9 billion in consequential damages this winter.

We can look at the situation from another perspective. The Commerce Department just determined that the nation's biggest foreign trade deficit on record,$1.67 billion,occurred this January. It reflects soaring oil imports and a decline in export shipping because of frozen harbors and waterways (NYT 77-III-1). Possible fuel savings of $5.6 billion would eliminate 3.4 months of such a trade deficit, consequential damages of $6.9 billion in the productive capacity of the nation would take care of another 4.1 months of extreme deficits.

We need technology transfer badly and we need an information explosion in the public's mind. It has been said that it is difficult to change the minds of the people and make every homeowner do what is reasonable to do. However most home owners are quite able to recognize an economic benefit when it is pointed out to them and willing to take advantage of it if they are able.

How about the public sector? It is certainly easier to influence and provides additional opportunities for savings. Measures have been taken in federal buildings with surprisingly effective results. You mentioned public schools, the Rhode Island School being one example. Yes, this makes sense! Public schools could be used to effectively demonstrate the current and expanded state of the art. They have high visibility and conservation here affects the home owners directly, since most of them are also concerned parents and are directly and emotionally affected by the massive closing of schools this winter. They also could readily appreciate the ultimate tax savings. Such steps teach the nation by example.

1 March 197

CRREL-CS
Mr. Robert A. Cox

The refitted schools themselves could be used to teach home owners how to better conserve energy. Simple handbooks and quick courses are needed. These should be based upon reliable information collected by available experts in the field. This is why I have suggested a modest $90 million for research and education. The actual refitting is, of course, much more expensive. But it is money well spent for the future with immediate benefits. It is also a good investment in public works, aiding the ailing construction industry, where many people are out of work, doing nothing and surviving on public funds anyway.

Thermography is an important link in this research and education effort. Not enough instruments are available. Those available are still expensive and there are very few trained observers. As a matter of fact the pioneers in the field still have to do all surveys themselves.

Thermography, however, is not the only tool and certainly not the limit of available and readily expandable knowledge. We do need a good, well considered plan, and decisive decision makers at the very top.

I wish you further success in the innovative approaches. Innovation means change and change means resistance; it is, therefore, an uphill fight!

Good luck and my best wishes.

Sincerely yours,

A. ASSUR
Chief Scientist

Senator Pell. The hearing is now adjourned.

[Whereupon, at 12:07 a.m., the subcommittee adjourned subject to the call of the Chair.]

EMERGENCY EDUCATIONAL ASSISTANCE ACT, 1977

FRIDAY, MARCH 11, 1977

U.S. SENATE,
SUBCOMMITTEE ON EDUCATION, ARTS AND
HUMANITIES OF THE
COMMITTEE ON HUMAN RESOURCES,
Washington, D.C.

The subcommittee met, pursuant to notice, at 10:05 a.m., in room 4232, Dirksen Senate Office Building, Senator Claiborne Pell (chairman of the subcommittee) presiding.

Present: Senators Pell, Javits, and Stafford.

Senator PELL. This hearing of the Subcommittee on Education, Arts and Humanities will come to order.

Today we are here to receive testimony on S. 701, the Emergency Educational Assistance Act. This is a bill designed to help our educational institutions confront the increased expenses due to the cost of energy and, at the same time, undertake measures which will enable them to conserve energy as effectively as possible.

Although we are now experiencing a respite from the harsh weather which we have felt during the past several months, we must not forget what this winter has been really like. Much of our Nation was severely affected by this winter.

The shock generated by the energy crisis which accompanied this winter reached our homes, our industries, our public services. Everywhere we looked, the picture was one of damage caused—of suffering felt.

Our educational institutions were particularly hard hit by this energy crisis. What used to be a minor item in school budgets, the cost of energy, escalated to the point where schools have been seeing more and more of their budget dollars being used to pay energy costs.

But budget costs are not the only expense our educational systems have been forced to bear because of the energy crisis. The human costs—costs occasioned by programs being curtailed, schools closing, children attending cold classrooms and then returning to cold homes—these, too, are a direct product of the energy crisis. And these human costs in the long run may be more damaging and harmful than the short-run budget increases that school systems are facing.

Over 3 years ago, on January 7, 1974, I convened hearings here in Washington concerning the effect the energy crisis was having, at that time, on our educational system. At that time, I said the energy crisis was not a short-term problem, but one that would be with us for years to come.

In 1974, the reality of the energy crisis was demonstrated. Yet, very few took that reality to heart. This past winter has shown, through its severity, that we can no longer afford to ignore that reality.

On February 14th of this year, I held a hearing in a public school in Pawtucket, R.I., to learn firsthand from people in the field—teachers, mayors, school board members, school superintendents, college presidents—the real and full extent of the energy crisis, and the effect it was having on schools in Rhode Island. The people who testified at that hearing painted a bleak and grim picture.

The story has been told before. It was told in 1974. It was told in Pawtucket, R.I., this past February. It is a story that demands our full attention. We must seriously confront the energy crisis, not just talk about it.

I had hoped that my hearings in 1974 would set an example for the rest of the Nation, an example of what we had to do to conserve energy and to control the energy crisis. That example, unfortunately, was not followed.

Yet, this past harsh winter may have provided the impetus to truly meet the challenge the energy crisis has presented. And what better area to meet that challenge than in the area of education.

Education consumes nearly 10 percent of all energy generated in our country. By solving education's energy problems, we will be going a long way toward solving the entire Nation's energy problems.

When I introduced S. 701, the bill we are considering today, I had two goals in mind.

First, I realized that our Nation's educational institutions sorely needed financial assistance to help them cope with the energy crisis. S. 701 provides such assistance.

Second: I introduced this bill to initiate a dialogue, one that will focus attention not only on the problems the energy crisis is bringing to education, but one that will also bring about the beginning of a real national commitment to energy conservation and to a sound and efficient national energy use policy. I hope S. 701 achieves these goals.

We have several panels today. I would like to move as rapidly as we can, because I should also be in a meeting of the Foreign Relations Committee.

Our first witness today is Dr. Shirley J. Hansen, associate director of the American Association of School Administrators, if she would come forward, please.

She is accompanied by Dr. James Scamman, superintendent of schools, Stevens Point, Wise.; Tom Bobo, assistant superintendent, Montgomery Ala.; and James R. Cox of JCox Associates, Vienna, Va.

STATEMENT OF DR. SHIRLEY J. HANSEN, ASSOCIATE DIRECTOR, AMERICAN ASSOCIATION OF SCHOOL ADMINISTRATORS, ACCOMPANIED BY DR. JAMES P. SCAMMAN, SUPERINTENDENT, STEVENS POINT, WIS.; TOM BOBO, ASSISTANT SUPERINTENDENT, MONTGOMERY, ALA.; AND JAMES R. COX, JCOX ASSOCIATES, VIENNA, VA.

Dr. HANSEN. Thank you, Mr. Chairman.

We are particularly appreciative of the fact that you have introduced this bill. Superintendents across the country have been extremely and increasingly frustrated as they have seen educational programs go up virtually invariably in smoke.

They identified this as a No. 1 concern for 1976. After the winter of 1977, I do not think there is any question of the concern of school administrators and also people across the country.

The American Association of School Administrators, on behalf of the superintendents, wish to commend you for recognizing this critical problem.

One of our great problems is that most of the schools across the country were built back in baby-boom times, when what was really critical, was space, not energy. Today that has been turned around.

But, unfortunately, for the country and education, those schools are out there and they are consuming energy inefficiently: 11 percent of space heating and cooling energy in this country is consumed by the schools. And it has been estimated that at least 50 percent of that is wasted. Unlike any other sector of the economy, the schools cannot pass along their increased costs, which have been going higher and higher. They either must go to the voters for increased revenues or they must cut the educational programs. That is a pretty grim choice.

Either increase the taxpayers' burdens or shortchange the students.

There is a third alternative, however: Increase the energy efficiency of the school buildings across the land.

There are 79,000 elementary schools, 26,000 secondary schools that desperately need this kind of help. Ironically, the increase in energy costs are consuming dollars that could otherwise have gone for energy-conserving modifications. A recent Federal Energy Administration survey says that 60.8 percent of the school administrators reported they simply do not have the funds to do the energy-conserving modifications that are needed.

This bill can turn that around.

For relatively small investments, major energy savings can be achieved. Sometime ago, AASA initiated a project, "Saving Schoolhouse Energy," to demonstrate the desirability of retrofitting school buildings and to provide school administrators with guidelines for cost effective, energy-conserving measures.

Across the Nation, 10 representative elementary schools were selected for the study. The preliminary results of the engineering analyses in the AASA project show that for a mean expenditure of

$25,323, energy consumption can be reduced an average of 50 percent, and the costs can be recovered in as little as 1 year and no more than 10 years. A management summary of these preliminary findings is submitted for the record.

Senator PELL. Let me be sure I understand.

You say $25,000 on a per project average will reduce energy use by about 50 percent?

Dr. HANSEN. That is what we found in our 10 demonstration sites. We went back to our engineers and asked them, did we select representative buildings, and they said yes. This is typical.

Senator PELL. What sort of work is done with that $25,000?

Dr. HANSEN. Pardon me?

Senator PELL. What sort of work is done?

What would the $25,000 be used for?

Dr. HANSEN. The actual money has not been expended yet. This is recommendations and costing of the recommendations.

Those recommendations involved reduction of outside air, night setback, and, in some instances, insulation work, reduction of glass, but primarily it was mechanical considerations that showed the greatest return in a quick time.

Senator PELL. What would be an example of a mechanical consideration?

Dr. HANSEN. I have with me today our consulting engineer, and I think he probably could speak to that better than I could.

Senator STAFFORD. Before he does, could I ask how large are these representative schools that you are talking about?

Dr. HANSEN. We deliberately tried to select elementary schools of pretty uniform size, and they are all approximately 40,000 square feet.

Mr. COX. To answer your question with respect to the mechanical kind of things, it would be upgrading or renovating the controls for the temperatures, upgrading the boiler, the heat and generating equipment, to achieve a more designed efficiency.

Through the years, the equipment has deteriorated in its maintenance, and operation, and so forth. In conjunction with that would be just to get the buildings back generally to their designed characteristics as well as improving these characteristics.

Senator STAFFORD. In other words, what you are saying is it is getting back more to the condition when it was built 30 or 40 years ago?

Mr. COX. Not only that, but improving them for $25,000. In other words, to reduce their energy consumption.

Senator PELL. How do you upgrade boilers?

Mr. COX. That is done, in some cases, by replacing the boiler.

But upgrading the boiler involves calibrating it, changing its burner, modifying its burner, or primarily just improving its operation.

Some of them I will call sloppy in their operation.

This involves making sure they have the proper combustion fuel-to-air ratios and that they do perform as they normally do at 80 percent, approximately.

Senator Stafford. Could I inquire, I understood you to say that insulation is not a major part of your considerations of this $25,000?

Mr. Cox. Generally speaking, that is true. Not in all cases. But, in most cases, that is a major expenditure. It depends on the particular school.

Senator Stafford. But the insulation would be a more expensive item, I gather, than the $25,000?

Dr. Hansen. I think we need to add here that we set a marker that if the recommendation would not pay off in 12 years at a 10-percent escalation in fuel, and that the cost avoided, in other words, on these conserving modifications did not pay back in that time, we would not recommend it.

Since insulation is a major expenditure, if the energy costs were not sufficiently high, or there was a problem structurally so that it cost a great deal to install the insulation, it would not pay off in that kind of time line.

Senator Stafford. Thank you.

Dr. Hansen. I would like to support the idea of matching basic grant approach.

I think it will provide strong incentives for the schools.

We certainly believe strongly that technical assistance is needed.

Mr. Bobo, here with me, will speak to that in a moment.

We appreciate the emphasis in the bill on basic grants and technical assistance, and feel this is as it should be, with demonstration grants often searching for new remedies.

We do respectfully ask the committee to take a look at two particular considerations in the field.

First of all, that there be some way in the language of the bill that the public schools will get a representative portion of the money allocated. Two-thirds of the square footage in educational facilities are in kindergarten–12 plants, but many of the small districts across the country—and most of the districts are small districts—do not have the built-in grantsmanship.

Our concern is that institutes of higher education that have this kind of build-in expertise might overwhelm these small districts that still critically need this kind of help.

Secondly: We believe it would be helpful if the bill stipulates percentage of appropriated funds for administering the program.

Once the law is enacted, keeping the regulations simple, concise, and responsive to those affected seems to be a perennial problem.

Mr. Chairman, in your speech in Las Vegas, you addressed the overregulations that now exist. We feel very concerned about this in the schools.

Responding to this concern, representatives of mechanical contractors, engineering and architectural societies and superintendents from across the country convened in late February. The results of their efforts, proposed application forms and criteria for ranking these applications for funding for S. 701 are attached for the record.

A list of the members of the committee drafting these applications and the associations they represented is also attached.

The broad representation of this committee indicates the broad support this bill has. The committee emphatically believes that all necessary information for appraising local conditions and for ranking the applications are incorporated in the forms submitted for your consideration. Every effort was made to keep them as simple and as brief as possible.

Yesterday, in my office, the assistant superintendent of Los Angeles, Bill Lucas, said he felt that the procedure in this bill is a model approach to the development of legislation, and I certainly believe the committee should be commended for its foresight in taking this approach to try to reduce regulations.

We certainly urge as quick a passage of this bill as possible.

I will confess that I prayed it would have snowed today. I was hopeful that it would be like 20 degrees outside, lest we forget the winter of 1977. I think we are all too prone to do that.

I brought with me a publication from National Schools that says: "Energy crisis," all over it. Unfortunately, this was published in January 1974, not 1977.

We seem to have forgotten what faced us at that time.

I hope we act very swiftly and bring forth the needed assistance schools need.

The winter of 1977 cost us a tremendous amount in education, in pupil-days lost. I have reported in my testimony 39,076,225 pupil-days lost due to energy shortage.

This morning I talked with the people in Ohio, and I have an even more staggering figure for you to update.

In Ohio alone, pupil-days lost are 17,461,690. This is a tremendous impact on the education of this country, and these have not all been Northern States. Five of the States that were closed due to the energy shortage were Southern States.

The same number of Btu's can keep more schools open more days next year if these modifications are instituted.

I believe the children of America will be the winner and so will we.

Each of the panel members would like to offer a few comments based on their experiences, and then we would all be pleased to answer any questions you might have.

[The prepared statement of Dr. Hansen and additional material follows:]

AASA

American Association of School Administrators

STATEMENT ON BEHALF
OF THE
AMERICAN ASSOCIATION OF SCHOOL ADMINISTRATORS

Concerning
S 701
EMERGENCY EDUCATIONAL ASSISTANCE ACT

Before the
SUBCOMMITTEE ON EDUCATION, ARTS, AND HUMANITIES
of the
SENATE COMMITTEE ON HUMAN RESOURCES

Submitted by

Dr. Shirley J. Hansen, Associate Director
American Association of School Administrators

Accompanied by

Dr. James P. Scamman, Superintendent, Stevens Point, Wisconsin;
Mr. Tom Bobo, Assistant Superintendent, Montgomery, Alabama;
Mr. James R. Cox of JCox Associates, Vienna, Virginia

March 11, 1977

Mr. Chairman and members of the Committee, I am Shirley Hansen. I am pleased to appear before you today on behalf of the American Association of School Administrators (AASA) to offer testimony on the Emergency Educational Assistance Act. With me are Dr. James P. Scamman, Superintendent of the Stevens Point Area Public Schools in Stevens Point, Wisconsin; Mr. Tom Bobo, Assistant Superintendent in Charge of Special Services, Montgomery Public Schools in Montgomery, Alabama; and Mr. James R. Cox of JCox Associates, AASA's consulting engineer for energy programs.

Mr. Chairman, school superintendents have become increasingly frustrated in recent years as they have seen more and more of their education programs veritably go up in smoke. In our annual federal issues survey, superintendents identified energy as their "No. 1" priority for 1976. After the "Winter of '77," think how they feel about it now. The American Association of School Administrators, representing superintendents across the nation, wishes to commend you for recognizing this critical problem to education and to the country by introducing the Emergency Educational Assistance Act.

Most of the schools in use today were built on a first cost basis when school administrators were pressed to find classroom space for post World War II "baby boom" children. Space was critical; energy was not. Energy inefficient buildings resulted. Today education and the country are paying dearly for those buildings. Over 11% of the space heating/cooling energy is consumed by the schools. It has been estimated that nearly 50% of this energy is wasted. A waste we can ill afford! A waste of our rapidly depleting energy resources. A waste of educational opportunities for the young people of our nation.

We all know energy costs have escalated rapidly. As these costs go higher and higher, the public schools, unlike any other sector of the economy, cannot pass these costs along. Educators can go to the voters for more revenues or they can cut educational programs. The choice is pretty grim: increase the taxpayers' burden or shortchange the students.

There is a third alternative. Make those schools more energy efficient. However, in a recent Federal Energy Administration survey, 60.8% of the school districts reported that they lack money to undertake energy conserving changes and modifications in their buildings. Ironically, increasing energy costs are consuming the dollars that could fund energy conserving modifications.

This bill provides the turn-around. It offers the schools an opportunity to conserve energy and to put the dollars back into the classroom.

For relatively small investments, major energy savings can be achieved. Some time ago, AASA initiated a project, Saving Schoolhouse Energy, to demonstrate the desirability of retrofitting school buildings and to provide school administrators with guidelines for cost-effective energy conserving measures. Ten representative elementary schools across the nation were selected for the study. The preliminary results of the engineering analyses in the AASA project show that for a mean expenditure of $25,323, energy consumption can be reduced an average of 50% and the costs can be recovered in as little as one year and no more than ten years. A Management Summary of these preliminary findings is submitted for the record.

The matching basic grant approach should provide a strong incentive for schools to seek these kinds of energy savings. Technical assistance is greatly needed for the school administrators anxious to conserve energy but unsure as to the most cost-effective energy conserving opportunities available to them. The authorizing levels in the bill place emphasis on basic construction grants and technical assistance. This is as it should be. While demonstration grants can seek to find more effective remedies for conserving energy in the schools, quick maximum effectiveness of any federal expenditure can be realized by putting simple known energy conserving measures in the schools--now.

Education is the only industry that exists in every community in the country. School buildings are very visible representations of that industry. It is most appropriate that the Congress seek to bring forth efforts to conserve energy in these buildings, for its ripple effect will affect other sectors of the economy.

There are two concerns related to the bill that I wish to place before the Subcommittee for your consideration. First, there is no language to assure that public schools get a representative portion of the money allocated. Two-thirds of the square footage in educational facilities are in K-12 plants, but many small districts do not have personnel skilled in grantsmanship. This does not, however, lessen their critical need for help. Institutions of higher education have this kind of expertise and also have federally authorized funds for retrofitting presently available to the public schools. AASA strongly urges the Subcommittee to provide some safeguard in the language of the bill to assure elementary and secondary schools a reasonable apportionment. Secondly, it would be helpful if the bill stipulated the percentage of appropriated funds which can be used for administering the program, both in the basic grant allotments to the states and in those administered by the Commissioner.

Once a law is enacted, keeping the regulations simple, concise, and responsive to those affected seems to be a perennial problem. Responding to this concern, representatives of mechanical contractors, engineering and architectual societies, and superintendents from across the country convened in late February. The results of their efforts, proposed application forms and criteria for ranking those applications for funding for S 701 are attached for the record. A list of the members of the committee drafting these applications and the associations they represented is also attached. The broad representation of this committee indicates the broad support this bill has. The committee emphatically believes that all necessary information for appraising local conditions and for ranking the applications are incorporated in the forms submitted for your consideration. Every effort was made to keep them as simple and as brief as possible.

Mr. Chairman, school superintendents are most appreciative that you and other members of the Subcommittee have perceived a very pressing educational need and have sought to remedy it. We implore you to move quickly to enact this legislation. Quick passage of this desperately needed relief could allow school districts to modify their buildings before the severest part of next winter.

In a study conducted for AASA by the Educational Research Service, it was found that at least 39,076,225 pupil-days have been lost so far this winter due to the energy shortage. About one-third of these are expected to be made up, but the others are irrevocably lost. If consumption is markedly reduced by modifications, the same number of BTUs can keep schools open more days next winter. The children of America will be the winners--and so will we.

Thank you.

Each of the panel members would like to offer a few comments based on their experiences and we'd all be pleased to answer any questions members of the Subcommittee might have.

Proposed Grant Application Form (S701) - Basic Grants

APPLICATION FOR FEDERAL ASSISTANCE ENERGY CONSERVATION - BASIC GRANTS	2. 3.
1. State Grantor Agency	4. Applicant
organizational unit	school district, department, division
administrative unit	
street address	street address
city state zip code	city county
	state zip code

5. Demonstrated energy need. Reason:

☐ a) high energy costs

☐ b) energy shortage

☐ c) unusually harsh and persistent adverse weather conditions

Relief is sought due to: (Explanation)
a) $ ______ / ______
unit of fuel
b) document
reduced allocation
school closing due to energy shortage
c) Degree days ______
(July 1, 1976-June 30, 1977

6. General description of Energy Conserving Measure(s):

7. Estimated cost (all measures) $______ Federal Share (50%) $______

8. BTU saved/year (over 1972-1973 BTU/year): ______

9. Type of fuel saved: ______

10 Cost/BTU: $______/BTU (1976-77 price)

11. Cost avoided/year: $______ (1976-77 price)

Authenticated by ______

Authorized by ______

12. Energy data

A FUEL USED 1972-73

KWH, TONS, Gal., CCF	TYPE	FACTOR	BTU x10^3	%	COST	COST/ BTU
gals	oil	138			/gal	
CCF	gas	100			/CCF	
tons	coal	24,500			/ton	
KWH	ELEC	3.41			/KWH	
	OTHER					
	TOTAL			100%		

B. FUEL USED 1976-77

KWH, TONS Gal., CCF	TYPE	FACTOR	BTU x 10^3	%	COST	COST/ BTU
gals	oil	138			/gal	
CCF	gas	100			/CCF	
tons	coal	24,500			/ton	
KWH	ELEC	3.41			/KWH	
	OTHER					
	TOTAL			100%		

13. Sq. ft. of building floor ____________________

14. Site/building description: (give building age; provide only those aspects of building envelope, heating, ventilating & air conditioning, plant & systems, lighting, usage, etc. pertinent to application) ____________________

____

____

15. Occupancy: students __________ (4th Friday count); grades or ages served __________;

adults FTE __________.

16. Degree days (July 1, 1976 - June 30, 1977) ____________________

17. BTU/sq. ft. 1972-73 ____________________ (grant building only)

BTU/sq. ft. 1976-77 ____________________ (grant building only)

18. BTU/sq. ft./degree days ______________________ (for 1976-77)

19. Calculated BTU/sq. ft./year to be saved by modifications (over 1972-73 figure)

________________________________ BTU/sq. ft./year ________

20. Amortization of capital cost:

a. Estimated cost of modifications $______________________

b. Calculated cost avoided at 1976-77 price: ______________ X ______________
BTU savings 1976-77 cost/BTU

$______________________

c. Cost avoidance table

76-77 Base Cost avoided	YEAR	FACTOR 20% Increase Compounded Annually	Cost Avoided	Cumulatitive Total
	977-78	1.20		
	1978-79	1.44		
	1979-80	1.69		
	1980-81	2.03		*

*If last cumulative total above does not exceed or equal the capital cost of the modifications, show number of years required for amortization of capital investment (attached calcuations) ______________ years

21. Matching funds

Local share (50% of estimated energy conserving measures, line 7)

$______________________

Proposed method of financing local share

Source of funding	Amount
1.	$
2.	$
3.	$
4.	$
TOTAL	$

Pending matching funds: (explain) ______________________

______________________ $______________

22. General description of the project.
Describe each energy conserving measure to be taken on a form identical to attached "Form B." Also include or attach calculations supporting quantitative information on Form B.

23. Attach qualifications information on authenticating authority.

24. Evaluating procedures:______________________________________

25. Are state approval procedures required for proposed energy conservation measures?

☐ yes ☐ no If yes, indicate status of approval:____________________

26. The applicant certifies that to the best of his/her knowledge and belief, the data in this application are true and correct, and that he/she will comply with the attached assurances if the grant is awarded.

TYPE NAME ____________________ TITLE ____________________

SIGNATURE OF AUTHORIZED REPRESENTATIVE ____________________

TELEPHONE NUMBER: AREA CODE ______ / ____________________

(Attachments

Form B
Assurances -- all legal documents; sharing information with private schools)

APPLICATION FOR FEDERAL ASSISTANCE

Energy Conservation -- Basic Grants

FORM B

General description of energy conservation measure:

Estimated cost $______

BTU saved/year ______

Type of fuel saved ______

Cost/BTU $______ BTU (1976-77 price)

Cost avoided/year $______ (1976-77 price

Authenticated by ______
signature

APPLICATION FOR FEDERAL ASSISTANCE
ENERGY CONSERVATION -- TECHNICAL ASSISTANCE

2.

3.

1. Federal Grantor Agency	4. Applicant
organizational unit	school district, department, division
administrative unit	
street address	street address
city state zip code	city county
	state zip code

5. Demonstrated energy need. Reason:

☐ a) high energy costs

☐ b) energy shortage

☐ c) unusually harsh and persistent adverse weather conditions

Relief is sought due to: (Explanation)
a) $________/________
unit of fuel
b) document
reduced allocation
school closing due to energy shortage
c) Degree days________
(July 1, 1976-June 30, 1977)

6. Energy data

A. FUEL USED 1972-73

KWH, TONS, Gal., CCF	TYPE	FACTOR	BTU x10^3	%	COST	COST/ BTU
gals	oil	138			/gal	
CCF	gas	100			/CCF	
tons	coal	24,500			/ton	
KWH	ELEC	3.41			/KWH	
	OTHER					
	TOTAL			100%		

B. FUEL USED 1976-77

KWH, TONS Gal., CCF	TYPE	FACTOR	BTU x 10^3	%	COST	COST/ BTU
gals	oil	138			/gal	
CCF	gas	100			/CCF	
tons	coal	24,500			/ton	
KWH	ELEC	3.41			/KWH	
	OTHER					
	TOTAL			100%		

7. Sq. ft. of building floor ____________________

8. Site/building description: give building age; additions; roof and wall structure; heating, ventilating and air conditioning plants and distribution systems; lighting, usage ____________________

9. Occupancy: Students ________ (4th Friday count); grades or ages served ________; adults FTE ________.

10. Degree days (July 1, 1976 - June 30, 1977) ____________________.

11. BTU/sq. ft. 1972-73 ____________________ by grant buildings.

12. BTU/sq. ft. 1976-77 ____________________ by grant buildings.

13. BTU/sq. ft./degree day ____________________ for 1976-77.

14. Other factors contributing to need for Technical Assistance grant (optional)

____

15. Identify proposed source(s) of Technical Assistance. Attach qualifications information.

16. The applicant certifies that to the best of his/her knowledge and belief the data in this application are true and correct, and that he/she will comply with the attached assurances if the grant is awarded.

TYPE NAME	TITLE
SIGNATURE OF AUTHORIZED REPRESENTATIVE	
TELEPHONE NUMBER: AREA CODE	/

PROPOSED CRITIERIA FOR RANKING APPLICATIONS FOR FUNDING UNDER EMERGENCY EDUCATIONAL ASSISTANCE ACT (S701)

I. BASIC GRANTS:

A. Eligibility criteria

1. Type of agency "educational institution":
   a) local educational agency
   b) institution of higher education

2. Energy conservation need:
   a) high cost of energy
   b) energy shortage
   c) unusually harsh and persistent adverse weather conditions

3. Local matching funds

4. State approval as required

5. Assurances are met

B. Application criteria

1. Potential energy savings (to receive greatest weighting)

2. Recovery rate (number of years cost avoidance will amortize capital invested)

3. Operational measures already taken (comparison of 1976-77 fuel consumption to baseline 1972-73 consumption)

4. Type of fuel saved

5. Supply capabilities for fuel

6. Energy audit; quality and implications

7. Regional concerns

8. Proposed evaluation procedures

II. TECHNICAL ASSISTANCE:

A. Eligibility criteria

1. Type of agency:
   a) local education agencies
   b) institutions of higher education
   c) state educational agencies
   d) state energy offices
   e) other appropriate state agencies
   f) consortium of any of above

2. Energy conservation need:
   a) high cost of energy
   b) energy shortage
   c) unusually harsh and persistent adverse weather conditions

3. Local matching funds

4. Assurances

B. Application criteria

1. Energy conservation need

2. Operational conservation measures already undertaken

3. Type of fuel

4. Local fuel supply capabilities

5. Qualifications of technical assistant(s)

6. Nature of technical assistance required

7. Regional concerns

8. Further statement of technical assistance need

Draft applications and criteria
submitted by:
Ad Hoc Committee on Energy/Education Legislation
March 11, 1977

AD HOC COMMITTEE ON ENERGY/EDUCATION LEGISLATION

Committee Roster

William C. Abernathy, Director of Industry Affairs
Mechanical Contractors Association of America
5530 Wisconsin Ave.
Suite 750
Washington, D. C. 20015
202/654-7960

William E. Adams, P.E.
City Manager
City of Las Vegas
228 View Drive
Las Vegas, Nevada 89107
Representing National Society of Professional Engineers

Calvin E. Anderson
Project Director, Energy
Colorado Department of Education
201 E. Colfas
Denver, Colorado 80203
303/892-2214
Representing National Association of State Directors of Educational Plant Services

George W. Bailey
School District 12
11285 Highline Drive
Denver, Colorado 80233
303/451-1561
Region 8

David Bullen, Executive Director
Energy Programs
American Institute of Architects
1735 New York Avenue, N.W.
Washington, D. C.
202/785-7300

James R. Cox. Jr.
JCox Associates, Engineers-Consultants
245 West Maple Avenue
Vienna, Virginia 22180
703/281-5115
AASA's Consulting Engineer

Robert Den Hartog, President
Association of School Business Officials
Lincoln Public Schools
Box 82889
Lincoln, Nebraska 68501
402/457-1081

Lawrence G. Derthick, Jr., Supt.
Monongalia County Schools
263 Prairie Avenue
Magantown, West Virginia 26505
304/292-6371
Region 3

William S. Fleming
William S. Fleming Associates
4495 Brickyard Falls Road
Manlius, New York 13104
Representing ASHRAE

Jeff Forker, Editor
Airconditioning and Refrigeration Business
614 Superior Ave. W.
Cleveland, Ohio 44113
216/696-0300

Dwayne Gardner, Executive Director
Council of Educational Facility Planners, International
29 West Woodruff Avenue
Columbus, Ohio 43210

William B. Haessig, Director
Division of Educational Facility Planning
New York State Education Department
Albany, New York 12230
Region 2

Shirley J. Hansen, Director
Saving Schoolhouse Energy
American Association of School Administrators
1801 N. Moore St.
Arlington, Virginia 22209

William Lucas, Assoc. Supt.
Los Angeles Unified School District
405 North Grand Avenue
Room A 407, Government Relations
Los Angeles, California 90051
213/625-6451
Region 9

Charles McDaniels, Supt.
P. O. Box 1708
Clarke County Schools
Athens, Georgia 30601
404/546-7721
Region 4

En Comm p.3

Carey Peck, Research Assistant
Subcommittee on Education
Senate Committee on Human Resources
United States Senate
Washington, D. C. 20510
202/224-7666

Harry Saunders, Director
School Building Planning Division
Los Angeles Unified School District
1425 S. San Pedro Street
Los Angeles, California 90051
213/625-5476
Region 9

Richard T. Scott, President
Environmental System Construction
4412 S. 89th St.
Omaha, Nebraska 68127
402/331-8250
Representing Mechanical Contractors Association of America
Chairman, Energy Conservation Committee

Ed Stephan, Deputy Director
Industry/Association Programs
Office of Energy Programs
Room 2012, Department of Commerce
14th And Constitution
Washington, D. C. 20230
202/377-5017
AASA's energy advisor

Charles L. Stuart
807 Dexter
Clay Center, Kansas 67432
913/1632-3176

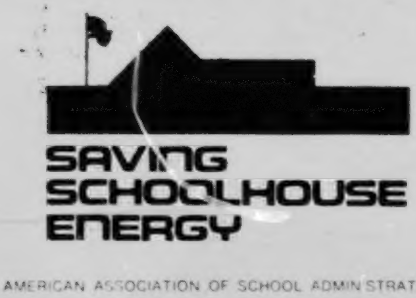
J. K. Williams
Pulaski Co. Special School District
1500 Dixon Road
P. O. Box 6409
Little Rock, Arkansas 72216
Region 6

Victor Wood
Oregon School District
5721 Seaman Road
Oregon, Ohio 43616
Region 5

Public Schools Energy Conservation Measures

MANAGEMENT SUMMARIES

DRAFT


SAVING
SCHOOLHOUSE
ENERGY

AMERICAN ASSOCIATION OF SCHOOL ADMINISTRATORS

MANAGEMENT SUMMARIES

PUBLIC SCHOOL ENERGY CONSERVATION MEASURES, REPORTS #1-10

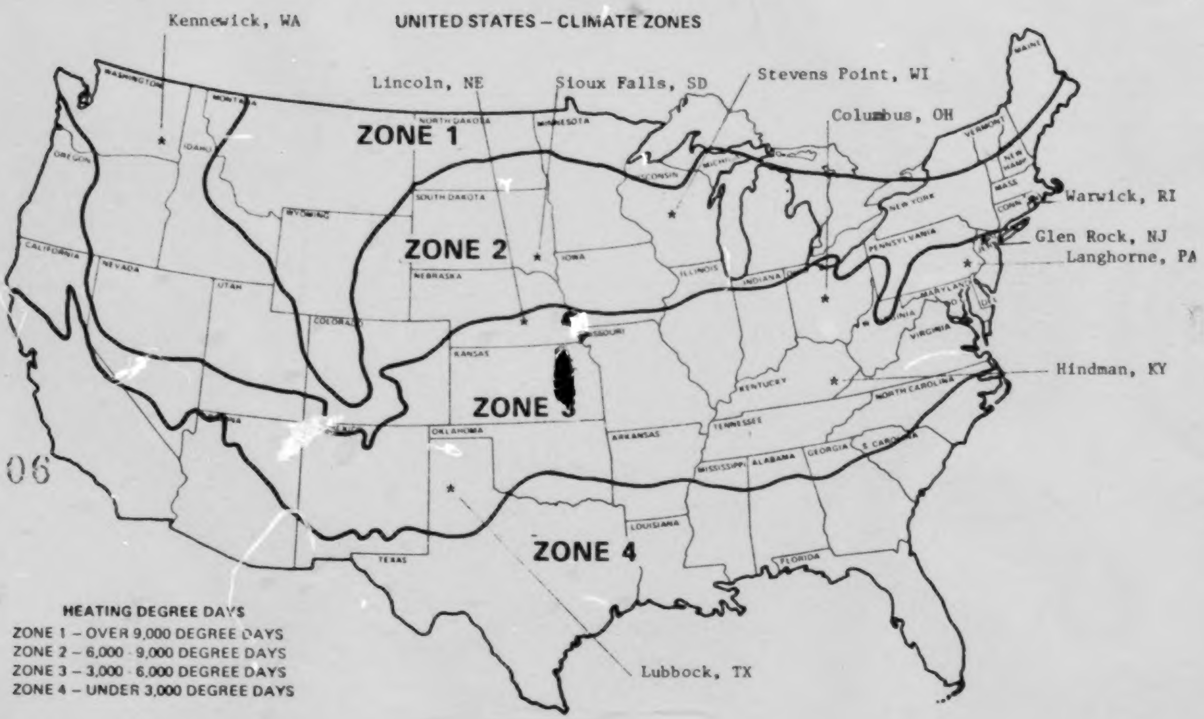
A thorough and comprehensive engineering analysis of ten representative elementary schools across the nation was undertaken to identify cost-effective energy conserving opportunities. The reports of these studies are designed to provide school administrators, engineers, architects, and associated technical personnel with indicators of potential energy savers in similar buildings. The following information is a brief compilation of these findings and abbreviated management summaries of these ten reports.

The demonstration sites selected were constructed from 1925 to 1973, were multi-level and single story, and varied from double loaded corridors to pod and open space schools. They were widely dispersed geographically (Figure 1). Six schools used natural gas as a fuel source, two used oil, and two had gas/oil option. Fuel costs ranged from $0.[illegible]1/Therm to $3.36/MCF for natural gas and was approximately $0.34/gal for oil. All schools were heated, two used unit air conditioners and one had central air conditioning. All schools were on a standard school year.

Cost-effective energy conserving opportunities have been recommended for implementation in all sites. "Cost-effective" was defined as recovering the cost of investment within 12 years from the predicted energy savings. Calculations were based on current fuel costs with 10 percent per annum escalation adjusted for interest rates.

Preliminary results show recommendations varied in cost by site from $1,000 to $80,425 with a mean recommended expenditure of $25,323. While modifications to the building envelop represented a significant portion of the total recommended expenditure, the most frequent recommendations were to adjust controls and to reduce outside air intake. They generally had the quickest recovery rate as well. Table 1 gives an overview of recommendations with associated capital cost estimates and recovery rates by site. Table 2 indicates the specific recommendations and estimated cost by site.

FIGURE 1. DEMONSTRATION SITES


UNITED STATES – CLIMATE ZONES
Kennewick, WA
Lincoln, NE
Sioux Falls, SD
Stevens Point, WI
Columbus, OH
Warwick, RI
Glen Rock, NJ
Langhorne, PA
Hindman, KY
Lubbock, TX
ZONE 1
ZONE 2
ZONE 3
ZONE 4
WASHINGTON
OREGON
CALIFORNIA
IDAHO
NEVADA
MONTANA
WYOMING
UTAH
COLORADO
NORTH DAKOTA
SOUTH DAKOTA
NEBRASKA
KANSAS
OKLAHOMA
TEXAS
MINNESOTA
IOWA
MISSOURI
ARKANSAS
LOUISIANA
WISCONSIN
MICHIGAN
ILLINOIS
INDIANA
KENTUCKY
TENNESSEE
MISSISSIPPI
ALABAMA
GEORGIA
FLORIDA
S. CAROLINA
NORTH CAROLINA
VIRGINIA
MARYLAND
PENNSYLVANIA
NEW YORK
VERMONT
NEW HAMP
MAINE
MASS
CONN
HEATING DEGREE DAYS
ZONE 1 – OVER 9,000 DEGREE DAYS
ZONE 2 – 6,000 - 9,000 DEGREE DAYS
ZONE 3 – 3,000 - 6,000 DEGREE DAYS
ZONE 4 – UNDER 3,000 DEGREE DAYS

5

The recommendations are made for existing buildings with the characteristics as described. They offer guidelines for analyzing buildings with similar characteristics; however, suggested energy conserving opportunities must be weighed in terms of the fuel used, its cost and associated savings as well as capital expenditure considerations. While it is not the primary intent of this report to address new construction concerns, the findings do have implications for such work.

It should also be noted that in a free market availability is reflected in cost. However, fuels have not had such a history. As long as fuel costs or supplies are in any way regulated, actual fuel availability may transcend the cost-effective characteristics of a modification.

As soon as the engineering reports have been approved by the Federal Energy Administration who supported this study,* they will be available at cost. An order blank has been attached at the back for your convenience. Any inquiries related to the study should be addressed to:

Dr. Shirley J. Hansen, Director
Saving Schoolhouse Energy
AASA
1801 No. Moore St.
Arlington, VA 22209

or to AASA's consulting engineer:

JCox Associates
Engineers-Consultants
245 West Maple Avenue
Vienna, VA 22180

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* Federal Energy Administration Contract No. CR-04-60711-00. The views and conclusions contained in this summary and in the engineering reports are those of the authors, and should not be interpreted as necessarily representing the official policies of the U.S. Government.

Following this summary table is a brief description of each school, more details as to the energy conserving opportunities (ECOs) recommended. Also noted are ECOs studied but not recommended at current fuel rates. As the cost of fuel exceeds the present rate, these ECOs may become cost-effective and should be reviewed. Any reconsideration should not view adjusted energy and dollar savings in isolation; materials, labor, interest rates, etc. must also be assessed.

TABLE 1. Demonstration sites, related information; ECOs, associated cost, and recovery rate.

Report No.	School	Location	Year(s) built/ sq. ft.	Fuel	Cost-effective ECOs	Est. Cost	Recovery rate years
1	Scott	Warwick, R.I.	1965,67/ 27,610 (pod)	gas	1.reduce outside air 2.night setback 3.replace boiler 4.add roof insulation	$37,800	5
2	Central	Glen Rock, N.J.	1925,39,50/ 45,384	oil	1.reduce outside air 2.replace boiler 3.chg.temperature settings 4.dampers 5.roof insulation 6.reduce infiltration	39,550	5
3	Everitt	Langhorne, Pa.	1954,58,67/ 49,314	oil	1.reduce outside air 2.replace boiler	21,200	9
4	Hindman	Hindman, Ky.	1957,66/ 32,338	gas	1.increase boiler efficiency 2.reduce glass 60%	13,659	5.3
5	Fairmoor	Columbus, Ohio	1949,55/ 42,765	gas	1.shut down unit vents, summer 2.improve boiler efficiency 3.night setback 4.reduce outside air	25,700	3
6	P.F. Brown	Lubbock, Tex.	1949,50,56/ 36,802	gas	1.update & improve controls	1,000	1.5
7	Eastridge	Lincoln, Neb.	1954,55/ 32,029	gas/ oil	1.reset & rebalance air handling units 2.night setback	10,000	5
8	Garfield	Sioux Falls,N.D.	1952,56/ 33,700	gas/ oil	1.reduce outside air 2.night setback 3.improve boiler efficiency	20,000	10
9	Plover Whiting	Stevens Point, Wisc.	1973/44,000 (open space, CAC)	gas	1.improve air conditioning usage schedule 2.improve indoor lighting schedule 3.air temperature reset 4.reduce outside air	3,900	1
10	Washington	Kennewick, Wash.	1957/40,124	gas	1.mechanical adjustments 2.night setback 3.roof insulation 4.reduce glass 5.replace incandescent lighting	80,425	7.5

TABLE 2. Types of recommendations by site.
Given in cost/recovery rate.

Site	Building Envelope			Lighting
	Insulate roof	Reduce glass	Infiltration	
1.Scott	$17,300/ 7			
2.Central	7,200/ 7		$6,000/6	
3.Everitt				
4.Hindman		$5600/ 7		
5.Fairmoor				
6.P.F. Brown				
7.Eastridge				
8.Garfield				
9.Plover Whiting				Schedule $0/I* ($366)
10.Washington	35,407/ 11.8	5447/ 4.2		Replace incandescent 29,571/ 9.38

* I for "immediate" return. ( ) gives estimated first year savings.

TABLE 2. Types of recommendations by site.
(con't.) Given in cost/recovery rate.

Site	Mechanical (HVAC systems)						
	Boilers		A.C.	Controls			
	Improve efficiency	Replace		Reduce O.A.	Night setback	Chg. temp.	Adjust u.v., dampers, controls
1. Scott		$19,500/9		$1000/1	$0/I* ($1535)		
2. Central		20,000/6		1000/1		$0.00/I ($565)	$1350/2
3. Everitt		20,000/11		1200/2			
4. Hindman	←	. . . . .	. . .	← $8,059/5 →		. . . .	→
5. Fairmoor	$10,000/3			7200/4	8500/3		Unoccupied shut down $0/I($844)
6. P.F. Brown							1000/1.5
7. Eastridge					base-board radiators 8000/5		
8. Garfield	9,000/10			3000/5	8000/10		
9. Plover Whiting			Schedule $0/I ($2934)	3000/2		900/6	
10. Washington							10,000/3.08

* I for "immediate" return. ( ) gives estimated first year savings

DEMONSTRATION SITE NO.1: Harold C. Scott Elementary School
Warwick, Rhode Island

Building Characteristics:

A. 1965 single story pod or modified open space school -- 27,610 sq.ft. with library, multipurpose, and administration areas. Walls are 4" face brick, 4" loose insulation, and concrete block with approximately 22% single pane glass. Roof has 2 1/2" insulrock supported by steel beams.

The building is heated by natural draft gas-fired boilers. Unit ventilators are in all classrooms, library, and multipurpose area. Convectors, radiators, and cabinet heaters are used in offices, toilets, and corridors. Gas consumption averages .085 MCF/sq.ft.

Illumination is primarily fluorescent. KWH/sq.ft. for all electrical demands averages 7.68.

400 students, K-6; 25 staff. School day: 9:00a-3:00p. School year: early September-late June.

Energy Conserving Recommendations:

- Rebalance unit ventilators to reduce outside air
  500 cfm to 250 cfm (R.I. code 10 cfm/stu
  Estimated cost: $1,000. Recovery Rate: less than 1 yr
- Revise occupied/unoccupied cycle - from 4:00a-4:00p to 8:00a to 3:00p; override for night use
  Estimated cost: $0.00. Recovery Rate: immediate. Projected savings 1st year: $1,535
- Replace gas-fired boilers with oil-fired boilers
  Estimated cost: $19,500. Recovery rate: 9 years
- Add roof insulation during re-roofing
  Estimated Cost: $17,300. Recovery rate: 7 years

All recommendations: $37,800 (est.). Recovery: 5 years.

ECOs not recommended warranting future review: double glazing all windows

# # # #

DEMONSTRATION SITE NO. 2: Central Elementary School
Glen Rock, New Jersey

Building Characteristics:

Constructed 1925, 2 levels; 1939 one level addition similar construction. 45,384 sq. ft. Wall is 4" face brick, 2" air, 8" concrete block with plaster interior finish with 35% glass, double hung single pane. Roof is built up roofing over plywood deck; 3' drop in interior ceiling finished with plaster board or acoustical tile.

1958 adition is single level. Wall is 4 "face brick on 8" concrete block with 60% single pane casements. Roof is built uup over wood sheatling with air space, 2" insulation and acoustical tile on interior surface.

Heated by (2) 1925 oil-fired low steam boilers (converted from coal). Unit ventilators and radiators in classrooms and auditorium. One pump for original structure and first addition; second pump for '58 addition -- controlled manually. Fuel consumption averages 0.94 gal/sq.ft.

Illumination is primarily fluorescent. KWH/sq.ft. for all electrical demands averages 3.5.

300 Students, K-6; 30 staff (includes district administration personnel). School day 9:00-3:00p; staff 8:00a to 6:00p. School year: early September-late June. 15 adults 8:00a-6:00p in July. Vacated in August.

Energy Conserving Recommendations:

- Reduce outside air
  --500 cfm to 175 cfm (state code)
  Estimated cost: $1,000. Recovery rate: 1 year
- Replace boiler with modular hot water boiler
  Estimated cost: $20,000. Recovery rate: 6 years.
- Reduce thermostat settings: 70 F to 68 F
  Estimated cost: $0.00 (maintenance). Recovery rate: immediate. Estimated savings 1st year: $5[illegible]
- Install motor operated damper to close louvers and roof ventilators in auditorium
  Estimated cost: $1,350. Recovery rate: 2 years.
- Install roof insulation: -- blanket type in existing 3' airspace. Estimated cost: $7,200. Recovery rate: 7 years.
- Infiltration reductions:
  --weather stripping windows and doors
  --automatic damper at roof ventilator
  Estimated cost: $6,000. Recovery rate: 6 years.

All recommendations: $39,550 (est.). Recovery rate: 5 years

ECOs not recommended warranting future review: institute warm-up cycle with dampers closed.

# # # #

DEMONSTRATION SITE NO. 3: Samuel Everitt Elementary School
Langhorne, Pennsylvania

Building Characteristics:

Constructed 1954 with two additions (1958, 1967): all have similar structure. 49,314 sq.ft. Walls are 4" face brick, air space, and [illegible] concrete block with approximately 45% glass in single pane casements. It has a built-up roof over 3 1/2" Insulrock supported by exposed steel beams.

Heated by (2) oil-fired hot water boilers. There is a 5.5 ton air conditioning unit for office area controlled by a 7 day time clock and two manually controlled window air conditioners for the library. Unit ventilators and radiators are used throughout the building.

Illunination is primarily fluorescent. KWH/sq.ft. for all electrical demand averages 3.27.

Everitt has 559 students, K-5. School day: 9:00a to 3:00p. School year: Early September to Mid-June. Used five nights per week and the office all summer.

Energy Conserving Recommendations:

- Reduce outside air intake
  --[illegible]00 cfm to 175 cfm (state req.)
  Estimated cost: $1,200. Recovery rate: 2 years.
- Replace boilers with modular hot water boilers
  Estimated cost: $20,000. Recovery rate: 11 years.

All recommendations: $21,200 (est.). Recovery rate: 5 years

ECOs not recommended warranting future review: double pane glass, and/or panel over clearstory glass.

# # # #

DEMONSTRATION SITE NO. 4: Hindman Elementary School
Hindman, Kentucky

Constructed in 1957 with addition of similar structure in 1966. Walls are 3 3/4" face brick, 1 5/8" air space, and 3 5/8" concrete block with 49% glass of 1/8" plate glass with aluminum frame. The roof is 1 1/2" rigid insulation, air space, and 2 3/4" blanket fiberglass on steel deck. Total area is 32,338 sq.ft.

Hindman is heated by a gas-fired cast iron sectional boiler with forced hot water circulating through convectors. Four sections were added in 1966 to accomodate addition. Classrooms do not have thermsotats. Building is zoned.

Illumination is primarily fluorescent with level at approximately 60 foot-candles.

611 students, 1-7, and 32 staff occupy building from 8:30a to 3:30p 180 days, mid-August to mid-May.

Energy Conserving Recommendations:

- Increase boiler efficiency to 80%, reduce outside air, and repair zone control
  --clean, adjust boiler; establish appropriate controls
  --set unit ventilators for redicial outside air; close dampers on night set back
  repair and correct zone thermostats and 3-way values
  Estimated cost: $8,059. Recovery rate: 5 years.
- Reduce glass by 60%.
  Estimated cost: $5,600. Recovery rate: 7 years.

All recommendations: $13,659 (est.). Recovery rate: 6.3 years

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# # # #

DEMONSTRATION SITE NO. 5: Fairmoor Elementary
Columbus, Ohio

Original structure build in 1949 was 23,500 sq.ft. on 3 levels. The walls are 4" brick face on 8" concrete block with 28% glass, N/S facing. Roof was rehabilitated 3 years ago with 2.5" insulating board on steel deck.

A 19,200 sq.ft. addition was added in 1955 bringing total square footage to 43.765 sq.ft. The addition is a single level. The walls are 4" brick face on 12" concrete block with 58% glass, E/W facing. The addition roof consists of built up roofing on 2 1/2" Tectum panels with no ceilings.

Fairmoor is heated by 2 gas-fired boilers converted from coal. There are unit ventilators in all classrooms -- steam in original section, hot water in addition. Therms/sq.ft. averages 1.5.

Illumination is primarily fluorescent with mercury vapor and incandescent in multipurpose room. Electricity demand is 3.56 KWH/sq.ft.

475 students, K-6 and 30 staff occupy the building 8:45a to 3:15p from early September to mid-June.

Energy Conserving Recommendations:

- Shut down unit ventilators in unoccupied summer months
  Estimated cost: $0.00. Recovery rate: immediate ($844 1st year)
- Improve boiler efficiency
  --replace burners
  --reduce flue size
  --install boiler controls to fire on demand
  Estimated cost: $10,000. Recovery rate: 3 years.
- Night set back
  --install time clock to shut unit ventilators, close dampers, stop exhaust fans
  Estimated cost: $8,500. Recovery rate: 3 years.
- Adjust unit ventilators to reduce outside air intake
  --air balance; upgrade controls
  Estimated cost: $7,200. Recovery rate: under 4 years.

All recommendations: $25,700 (est.). Recovery rate: under 3 years

---

ECOs not recommended warranting future review: double glazing, insulate addition roof, add double doors, or reduce glass

# # # #

DEMONSTRATION SITE NO. 6: P. F. Brown
Lubbock, Texas

Original 1949 structure and 1950 addition comprise 25,258 sq.ft. single level. Of similar construction - walls are 4" face brick on 8" structural tile with interior plastered with 16.5% glass, N/S facing. Roof is 3" concrete deck, ceiling plastered.

1956 addition brought total footage to 36,802 sq.ft. This addition is essentially the same with the exeption of acoustical board on ceiling and the double hung windows have an E/W orientation.

P. F. Brown has one gas-fired, fire tube, low pressure steam boiler. There are no unit ventilators. Outside air by infiltration only. Gas consumption averages 091 MCF/sq.ft.

Illumination is primarily fluorescent. Total electrical demand averages 2.185 KWH/sq.ft

388 students, K-6, and 46 staff occupy the building 8:00a to 3:00p late August through May.

Energy Conserving Recommendations:

- Update and improve controls
  Estimated cost: $1,000. Recovery rate: 1.5 years

ECOs not recommended warranting future reveiw: increase efficiency of heating plant.

Adding roof insulation, replacing glass blocks, and contracting weather stripping all had recovery rates over 50 years.

# # # #

DEMONSTRATION SITE NO. 7: Eastridge Elementary School
Lincoln, Nebraska

Constructed in [illegible] and added in 1955, Eastridge has essentially the same structure. Walls are 4" brick on 4" cavity block with 4" face brick veneer. Glass is single pane clear and frosted above, 27% of wall with predominance N/S facing. Roof is built up tar and gravel on 3 1/2" cedar deck, 3/4" acoustical tile ceiling.

Eastridge is heated by 2 gas/oil fired hot water boilers. It has hot water baseboard radiators and hot water central air handling units.

Illumination is fluorescent.

300 students, K-6, occupy the building from 8:40a to 2:40p; 25 staff members from 8:00a-4:30p for 178 days each year.

Energy Conserving Recommendations:

- Resetting and rebalancing air handling unit
  Estimated cost: $[illegible],000. Recovery rate: 4 years
- Night set back for baseboard radiation
  Estimated cost: $8,000. Recovery rate: 5 years

ECOs not recommended warranting future review: add roof insulation, reduce glass by 17%, or add exterior wall insulation.

# # # #

DEMONSTRATION SITE NO. 8: Garfield Elementary School
Sioux Falls, South Dakota

Constructed in 1952 and added to in 1956 for a total of 33,700 sq.ft. Garfield has two levels. Walls are 4" face brick on 8" concrete block with about 30% glass. Of this glass area, 70% is glass block and the remainder is plate. The roof is 4 ply pitch and felt, 2" semi-rigid insulation, and 1 1/2" metal deck.

Garfield is heated by 2 gas/oil fired hot water boilers. Hot water baseboards and hot water central air handling units handle the heating and ventilating requirements.

Illumination is primarily fluorescent.

500 students, K-6, occupy the building 8:30a to 3:15p; 26 full time and 8 part time staff are there from 8:30a to 4:00p for 180 days per year.

Energy Conserving Recommendations:

- Reduce outside air to minimum code (5 cfm)
  Estimated cost: $3,000. Recovery rate: 5 years
- Night set back system
  Estimated cost: $8,000. Recovery rate: 10 years
- Improve boiler efficiency
  Estimated cost: $9,000. Recovery rate: 10 years

All recommendations: $20,000 (est.). Recovery rate: 10 years

ECOs not recommended warranting future review: add roof insulation, add exterior wall insulation, or reduction of glass.

# # # #

DEMONSTRATION SITE NO. 9: Plover Whiting Elementary School
Stevens Point, Wisconsin

Plover Whiting is an open space school of 44,000 sq.ft. constructed in 1973. It has three distinct wall types: (1) 3/8" diagonal wood siding, 1" rigid insulation, 3/4" air space, and 8" concrete block; (2) as "1" with 12" concrete block around gym; and (3) 3/8" wood siding, 3/8" gypsum sheathing, 2" air space, 3 1/2" batt insulation on 6" stud wall with 5/8" GWB on interior. Glass averages 6.9%. Roof is built up, 1 1/2" rigid insulation, 1 1/2" metal deck, and 3/4" acoustical ceiling tile.

Plower Whiting is heated/cooled by 2 forced draft gas-fired boiler and 120 ton reciprocating chiller. Classrooms and multi-purpose are heated, ventilated and air conditioned by 3 central air handling units. Uses average .9 therms/sq.ft.

Illumination is primarily fluorescent. Electrical load demand is approximately 10.5 KWH/sq.ft.

472 students, K-6, and 28 staff occupy the building from 9:00a to 3:30p for approximately 180 days, late August to mid-June.

Energy Conserving Recommendations:

- Improve air conditioning usage schedule
  Estimated cost: $0.00. Recovery rate: immediate ($2,934 1st year)
- Improve indoor lighting usage schedule
  Estimated cost: $0.00. Recovery rate: immediate ($366 1st year)
- Air temperature reset mixed and supply
  Estimated cost: $900. Recovery rate: 6 years
- Reduce outside air intake to minimum code (5 cfm/person)
  --rebalance outside, return, and exhaust dampers
  Estimated cost: $3,000. Recovery rate: 2 years

All recommendations: $3,900 (est.)
Recovery rate (investments only): 2 years
all recommendations: 8 months.

ECOs not recommended warranting future review: add roof insulation and/or add wall insulation.

# # # #

DEMONSTRATION SITE NO. 10: Washington Elementary School
Kennewick, Washington

Washington is a single level structure built in 1957 with no addition. The three wing double loaded corridodrs has a total area of 40,124 sq.ft. Walls are precast panels and 3/4" rigid insulation with 50% glass (1/4" plate). The roof is built up roofing with 2" rigid insulation on steel deck with 2% sky-light.

Heating is by a gas-fired induced draft steel boiler. Distribution is on 3 zones with unit ventilators in classrooms, multipurpose, and administrative areas. Consumption averages .84 therms/sq.ft.

Illumination is incandescent throughout. Total electrical demand is approximately 5.94 KWH/sq.ft.

503 students, K-6, occupy the building 9:00a to 3:15p and the staff from 8:00a to 3:45p from early September to mid-June.

Energy Conserving Recommendations:

- Mechanical adjustments and maintenance
  --bring outside air up to code (5 cfm)
  --bring pump, filters, coils, fan motors, and damper linkages to maximum efficiency
  --calibrate and reduce thermostat settings
  --provide night setback capability
  Estimated cost: $10,000. Recovery rate: 3.08 years
- Add roof insulation in re-roofing process
  --3" rigid insulation
  Estimated cost: $35,407. Recovery rate: 11.8
- Reduce glass by 28% - fixed window modules with N, E or W exposure
  Estimated cost: $5,447. Recovery rate: 4.2
- Replace incandescent lighting with fluorescent at code (50 classroom, 20 corridors)
  Estimated cost: $29,571. Recovery rate: 9.38

All recommendations: $80,425 Recovery rate: 7.5 years

ECOs not recommended warranting future review: change from gas-fired to electric boiler.

ORDER FORM

Public School Energy Conserving Measures

Report No.

1. **SCOTT:** *1965,67 pod; replace boilers, add roof insulation, controls ($37,800/5 yr. return)* ____________
2. **CENTRAL:** *1925,39,50; replace boilers, roof insulation, reduce infiltration, controls ($39,550/5 yr. return)* ____________
3. **EVERITT:** *1954,58,67; replace boiler, reduce outside air ($21,200/9 yr. return)* ____________
4. **HINDMAN:** *1957,66; increase boiler efficiency, reduce outside air, night set back, controls, reduce glass 60% ($13,659/6.3 yr. return)* ____________
5. **FAIRMOOR:** *1949,55; improve boiler efficiency, revise unoccupied settings, reduce outside air, night set back ($25,700/3 yrs. return)* ____________
6. **P.F. BROWN:** *1949,50,56; update and improve controls ($1000/1.5 yr. return)* ____________
7. **EASTRIDGE:** *1954,55; reset and rebalance air handling units; night set back ($10,000/5 yr. return)* ____________
8. **GARFIELD:** *1952,56; reduce outside air, night set back, improve boiler efficiency ($20,000/10 yr. return)* ____________
9. **PLOVER WHITING:** *1973; air condition schedule, indoor lighting schedule, air temperature reset, reduce outside air ($3,900/1 yr. return)* ____________
10. **WASHINGTON:** *mechanical adjustments, night set back, roof insulation, reduce glass, replace incandescent lighting ($80,425/7.5 yr. return)* ____________

No. Reports Requested ____________

Each report at cost ($2.50) including postage and handling as soon as cleared by Federal Energy Administration.

Enclosed is $____________(# reports X $2.50)

Make check payable to AASA-Energy and mail to:

Dr. Shirley J. Hansen
AASA-OGR
1801 North Moore Street
Arlington, VA. 22209

Dr. Hansen. Mr. Bobo is from Alabama, and I think he can speak critically to the fact that this is a southern problem as well.

Mr. Bobo. I wish to thank this committee for allowing me to be a part of the testimony for S. 701. I can state the need for such a law is great.

It is my firm belief that we must begin now to do all that is in our power to conserve energy, not only because of the limited supply of energy, but because of the tremendous cost—the cost, of course, is borne by the taxpayers.

I would like to quote from the chief State school officer's statement for this committee. He says that the jet stream was confused and dumped masses of Arctic air to Southern States earlier this year. And for several days the temperature hovered slightly above zero and temperatures in Montgomery, Ala., were lower than in Nome, Alaska.

Most of our schools were closed and not designed for this, and were closed as a result of this weather.

One can see from this statement that this is not just a problem for one segment of our country, but every section.

The Montgomery public schools, city and county, has 35,963 children enrolled as of September 17, 1976. This school system spent 81.54 percent for instruction and only 4.92 percent for operation in 1975 to 1976. Records thus far for the 1976 to 1977 school year show a continual acceleration of operation expenses.

The only place from which funds for these added costs of utilities can be taken is from the instructional program. These are funds that would be used for teachers' salaries and teaching materials.

On page 2 of my testimony we did a 5-month study for a 3-year period as to electrical bills during this time. We found during this particular time between fiscal year 1975 and fiscal year 1976 that we spent an additional amount of $24,000 for electricity alone. For the period of time for fiscal year 1976 between fiscal year 1977, we spent $47,000 for this period of time.

During the 5-month period that we added the 2 amounts together, we could have employed 15 teachers for what we spent for the electric bill alone. We did also a study for the gas bill during a 5-month period of time for a 3-year period. Here again between fiscal year 1975 and 1976, we spent an additional $13,000 over that for gas alone.

Between fiscal year 1976 and fiscal year 1977, we spent over $32,000 for additional amounts for gas.

With these 2 amounts added together, we could have employed 10 teachers that would have served in instruction during this particular period of time.

We went back and did some studies on three different schools. On page 4 of the testimony, you can see the schools for which we took a sampling.

One, Jefferson Davis High School, with a population of 2,350 students; Southlawn Elementary School, a relatively new school, 680 students; and Robert E. Lee School, with a population of 2,474, and was built around 1955.

For the electrical bills alone, one can see the accelerated cost, and in some cases even doubling the amounts over the same period of time, the same months 1 year ago.

Using these three schools that we have chosen here, the electrical bills over this period of time over $7,000. The gas bills increased over $9,000 during this particular period of time.

One can see the increase of cost that has taken place. The board of education for fiscal year 1977 budgeted over $707,000 for utilities. As of the end of February, we had spent 43 percent of this amount, and it is anticipated for this year alone we would have to budget in addition for $707,000, $212,000 additional dollars to pay for the utility bills.

If we are to do the things necessary and to conserve energy and save cost, then we must have technical assistance in the modification of many of our buildings.

Senator PELL. Thank you very much for your testimony.

I was struck with the form that you submitted. I asked the Library of Congress the other day for a rough estimate of the money spent on Government forms, and I was amazed to find that they came back with the answer that about $20 billion a year is spent by the Government in the printing, making up and processing of Government forms, and another $20 billion is spent each year in the private sector in terms of time spent filling out. It is $40 billion a year in a trillion dollar economy. And if my arithmetic is correct, that is 4 percent of the national economy which goes into filling out forms, which is shocking.

I congratulate you on this form. If we keep the final form simple, then schools could probably fill it out without additional personnel.

Mr. Bobo, your district, while it may be cooler than Nome, Alaska, for 1 day, is, generally speaking, a bit warmer.

I am wondering how many of your schools are air-conditioned, and how much energy goes into keeping them air-conditioned?

Mr. BOBO. We do have some of this. We have only started air conditioning buildings in the last, perhaps, 10 years.

All the buildings before that time were not air-conditioned. We have 52 schools, and I would say 10 or 20 percent of them are air-conditioned.

Senator PELL. Would you think one should give serious thought to the idea of stopping air-conditioning of schools and go back to the old architecture, like the Spanish architecture, in order to keep cool.

Has thought been given to that?

Mr. BOBO. No, sir, it has not up to this time. But thought is being given to it now.

With these type studies we have done, we will give thought to this, and we need to.

Senator PELL. Your schools recess for the summer months of July and August. I would think that in an energy crisis, a conservation-minded world, that money should not be spent for air-conditioning.

I think if we build our buildings properly, we might be able to avoid it.

Obviously, with the way buildings are built now, for example many are built with fixed windows, you have to have air-conditioning.

Mr. Bobo. I think with proper technical assistance and with some modification, we could make great improvments in the amount of heat that we have in the rooms during this period of time. But we have not done the studies that need to be done in this.

[The prepared statement of Mr. Bobo follows:]

UNITED STATES SENATE

SUBCOMMITTEE ON EDUCATION

Honorable Claiborne Pell, Chairman

11 March, 1977

Statement of

Thomas A. Bobo
Assistant Superintendent

Montgomery Public Schools
307 South Decatur St.
Montgomery, Alabama

SENATE BILL 701

EMERGENCY EDUCATIONAL ASSISTANCE ACT

Thomas A. Bobo
Assistant Superintendent
Montgomery Public Schools

Montgomery
Public
Schools

P.O. Box 1991
Montgomery, Alabama
36103

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TESTIMONY S-701

I wish to thank this committee for allowing me to be a part of the testimonial for S-701. I can state that the need for such a law is great. It is my firm belief that we must begin now to do all that is within our power to conserve energy, not only because of the limited supply of energy but because of the tremendous accelerating cost--a cost that is borne by the tax payer who supports the public school children of this nation.

The Montgomery Public Schools, City and County, has 35,963 children enrolled as of September 17, 1976. This school system spent 81.54% for instruction and only 4.92% for operation in 1975-76. Records thus far for the 1976-77 school year show a continual acceleration of operation expenses.

The only place from which funds for these added costs of utilities can be taken is from the instructional program. These are funds that would be used for teachers' salaries and teaching materials.

The following is a listing of the electric bills for a five-month period --September through January for 1974-75, 1975-76 and 1976-77:

	1974-75	1975-76	1976-77
September	$23,211.22	$32,577.11	$42,038.78
October	30,981.00	36,899.50	47,157.97
November	34,570.14	37,571.30	43,628.94
December	27,653.64	33,965.46	43,848.13
January	34,666.93	[illegible],258.84	46,487.95
TOTALS	$151,082.93	$175,272.21	$223,161.77

The totals for 1974-75 are -------$151,082.93
for 1975-76 are -------$175,272.21
and for 1976-77 are -------$223,161.77

This represents an increase of $24,189.28 for the 5-month period from 1974-75 to 1975-76. With this amount we could have employed 5 teachers in our school district for a 5-month period. There has been an increase of $47,899.56 over a five-month period from 1975-76 to 1976-77--an amount with which we could have employed 10 teachers for a 5-month period.

One can see the tremendous increase which is taking place in the electric bills of our school system, despite the fact that most of our buildings do not use electricity for heating.

The gas bills for this same period reflect a similar trend:

	1974-75	1975-76	1976-77
September	$ 518.97	$ 610.90	$ 507.98
October	1,533.68	2,228.65	1,937.52
November	6,147.60	3,512.07	19,344.22
December	18,316.75	21,402.14	33,416.74
January	21,742.23	34,426.27	39,231.20
Totals	$48,259.23	$62,180.02	$94,437.66

The totals for 1974-75 are -------------- $48,259.23

for 1975-76 are -------------- $62,180.02

and for 1976-77 are -------------- $94,437.66

This represents an increase of $13,920.79 for the five-month period of 1974-75 to a relative period of 1975-76. Records show an increase of $32,257.64 for the five-month period of 1975-76 to a relative period of 1976-77. These two increases alone could have provided 10 teachers for the 5-month period.

Three schools were chosen to be representative of the costs for electricity and gas for the five-month period of September - January for the years 1974-75, 1975-76, and 1976-77. Jefferson Davis has a floor space of 101,060 square feet and is heated by gas and cooled by electricity. The student enrollment for Jefferson Davis is 2350. Robert E. Lee High School has a floor space of 136,478 square feet, heated by gas and no cooling system. The student enrollment for Lee High School is 2474. Southlawn Elementary School has a floor space of 32,159 square feet. The school is heated by gas and cooled by electricity. The student enrollment for Southlawn is 680.

The following is a breakdown of the gas and electric bills of these three schools which are representative of the system's 52 schools for the period September - January for the years 1974-75, 1975-76, and 1976-77:

ELECTRICITY

	Schools	1974-75	1975-76	1976-77
September	Jefferson Davis	$ 3,814.59	$ 4,100.48	$ 5,075.68
	Southlawn	1,083.49	1,674.58	1,708.91
	Robert E. Lee	915.86	924.39	1,738.60
October	Jefferson Davis	3,544.50	3,548.10	4,343.82
	Southlawn Elem.	1,031.34	1,260.72	1,508.00
	Robert E. Lee	2,219.07	2,308.59	2,224.68
November	Jefferson Davis	2,929.41	3,419.06	3,021.54
	Southlawn Elem.	983.86	1,189.62	930.36
	Robert E. Lee	3,772.43	2,371.19	2,605.89
December	Jefferson Davis	2,244.36	2,835.52	3,355.84
	Southlawn Elem.	701.25	--------	992.71
	Robert E. Lee	--------	--------	2,522.60
January	Jefferson Davis	2,655.36	2,732.26	4,348.06
	Southlawn	757.07	1,044.90	1,141.80
	Robert E. Lee	2,084.63	2,084.63	2,824.71
	TOTALS	$2[illegible],737.22	$29,822.80	$35,800.96

GAS

	Schools	1974-75	1975-76	1976-77
September	Jefferson Davis	$ 912.25 CR	$ 24.47	$ 40.86
	Southlawn	-------	62.18	---------
	Robert E. Lee	69.95	83.93	46.24
October	Jefferson Davis	883.57CR	56.67	46.24
	Robert E. Lee	82.15	129.80	134.92
	Southlawn	-------	72.02	-----
November	Jefferson Davis	722.05CR	113.54	223.74
	Robert E. Lee	572.57	387.93	1,457.90
	Southlawn	41.45	56.88	101.65
December	Jefferson Davis	366.36CR	599.19	1,200.66
	Robert E. Lee	1,891.31	2,052.85	2,614.20
	Southlawn	-------	260.03	220.43
January	Jefferson Davis	801.68	1,106.03	1,422.69
	Robert E. Lee	1,423.56	3,101.57	3,624.13
	Southlawn	-------	420.18	403.02
	Total	$1,991.14	$8,696.90	$11,535.68

Using these 3 representative schools, a total increase in electric bills of $7,063.74 from 1974-75 to 1976-77 and an increase in gas bills of $9,544.54 from 1974-75 to 1976-77 has been reflected.

I might add that the funds spent for gasoline for transporting the students in Montgomery County during this period have increased 31.25%. In September, 1974, the Montgomery County Board of Education was paying $.32 per gallon for gasoline. In September of 1976, the Board was paying $.42 per gallon. The Board owns 222 buses which travel 10,937 miles per day with each bus getting approximately 4.48 miles per gallon.

The Board of Education budgeted $707,000.00 for utilities in October, 1976. To this point we have used $306,000 or 43.3% of this budgeted amount. It is anticipated that there will be an increase of $212,100.00 for utilities needed for the FY 1977 school year over the budgeted amount. Again, there is only one place to secure these added funds--from the instructional program.

In addition to increased rates and severe cold affecting the utility costs, Alabama Power Company has been granted a monthly energy cost adjustment by the Public Service Commission as reflected in the following figures:

September -------------------	$7.21
October ---------------------	7.01
November --------------------	7.84
December --------------------	9.18
January ---------------------	9.27

The recent effect of this on the utility costs can be seen in that for every thousand kilowatt hour of power used there has been an increase of $2.06 from September, 1976 to January 1977.

If we are to do the things necessary in our buildings to conserve energy and save costs, the passage of S-701 is imperative.

Senator Pell. I think on the whole 4 percent of the money that is spent on energy in America is spent to keep us cool. I commend that thought to you.

Thank you very much.

Dr. Hansen. Mr. Scamman of Stevens Point, Wisc., just conducted the technical assistance type of study which you have in your bill. We would like him to speak to that very quickly as to the kinds of things he found.

Senator Pell. Good.

Mr. Scamman. Thank you.

I would like to concur in your cost of filling out forms, as one local official that has a number of forms to fill out regularly.

Stevens Point is located in the heart of Wisconsin where we have an average temperature of 44 degrees year round, which is a rather cool location. We are a district of 3,000 students, smaller than Montgomery, but it reminds you that 75 percent of the districts in the United States—and that is typical of the Midwest, at least—are smaller than 2,000 students.

We are the 18th largest district in the State of Wisconsin. We are 13th in use of energy across the Nation. We are not a small consumer.

Our problem in Wisconsin is similar to that of Mr. Thomas Smith's testimony before your committee in Rhode Island.

Our district has, in contrast to some others that managed to maintain a level budget expenditure for energy by cutting back. We have kept careful records on a year-by-year basis of each school and engaged in the commonsense sort of reductions that everybody in magazine articles says you ought to do.

Because of that, we have experienced a 37-percent reduction in overall use of therm per degree day in our school system. We have experienced 37-percent reduction in the use of energy in the past 3 years.

This year, for example, that is a $66,000 saving for the first 8 months of this school year. To give you an example of that, we recalibrated the controls in one school, cost $1,500, and we got that money back in less than 3 months.

What we are asking the committee for for our particular situation is to help us go into the next step.

We have projected—and these are based on bids and quotations, these are not just guesses—that we can double the savings we have already experienced by another 37 percent. The total cost for our district somehow, either through Local or a combination of Federal moneys, about $179,500. That would be $10,000 for calibration; $75,000 for adjustments to heating, ventilation, air conditioning system, and $94,500 for insulation.

The payback on recalibration would be less than 1 year, and the payback on HVAC is three years, and the insulation payback would be less than 5 years.

If we were able to add to 37 percent we have experienced another 37 percent, that would be a total of 74 percent per therm per degree day reduction for our school system.

We are at a point where we need additional financing.

Senator PELL. Those paybacks will probably be even quicker because the cost of fuel in 5 years will be higher than it is today.

Mr. SCAMMAN. That is quite true.

Our district has found because of our experience that we feel there is enough technical knowledge floating around that the need for additional demonstration sites probably would not be money as well spent, as if the money could be put in additional technical assistance.

Most of the quick savings will result by bringing the mechanical assistance back to the original specifications. If you are interested in rather substantial national energy savings, it seems to me that would be the quickest and best approach.

[The prepared statement of Mr. Scamman follows:]

Statement by James P. Scamman
District Administrator (Superintendent)
Stevens Point, Wisconsin, Area Public School District

On Energy Conservation

Before

U.S. Senate Subcommittee on Education

March 11, 1977
Washington, D.C.

Introduction

Mr. Chairman, and members of the Senate Subcommittee on Education, I am James P. Scamman, Superintendent of the Stevens Point, Wisconsin, Public Schools.

As Superintendent of Schools, I act as the chief executive officer for the School Board of the Stevens Point schools and am responsible for the orderly and efficient administration of the schools serving that community. In that capacity, I am obligated to carry out the laws of the State of Wisconsin and the United States of America, to abide by the policies and directives of the Board of Education, and to propose alterations in school operations aimed toward maximizing efficiency in light of the goals for which the school system exists.

Mr. Chairman, I am honored to have the privilege to appear in front of you today and to discuss what has become in recent years the most severe crisis facing all of us nationally. It is not an exaggeration to state that the question of the energy shortage has generated more heat than light. It is not my main goal here to review the national situation regarding the energy shortage that we all know so well. The experience of the past several years, highlighted by the crisis of the last two months, certainly is adequate documentation that a serious problem does exist.

According to a recent survey of 498 randomly selected school districts, the Federal Energy Administration (1) found that school districts spent from 39% more for electricity to 92% more for fuel oil in 1974-75 than was spent in the 1972-73 school year. This, in spite of a decline in overall consumption. The Upper Midwest Region, in which Stevens Point is located, experienced a 50% increase in expenditure for all fuel from the 1972-73 school year to the 1974-75 school year.

Edward Stephan (2) has indicated a potential savings of 25 million barrels equivalent of oil per year at a current dollar savings of ten million dollars if projected modifications can be made in the way schools use energy. He indicates that if the approximately 86,000 schools save 30% overall, a 68,000 barrels savings per day could be realized. Stephan further cites the impact on school budgets when increased energy costs force cuts in maintenance and operations which further aggravates the energy situation and effectively frustrates efforts of local school officials to achieve necessary efficiencies.

Background

As previously stated, it is not the primary purpose of this presentation to speak to the issue of energy conservation nationally, or even to any great extent on a state-wide basis in Wisconsin. It is more specifically the purpose to discuss the experiences at Stevens Point and the projections that we have made for our school district.

Stevens Point

The Stevens Point school system is the 18th largest district in the State of Wisconsin enrolling just over 8,000 students, kindergarten through twelfth grade. There are nine elementary attendance areas, including eleven buildings, two junior high schools and one senior high school. In addition to the public schools, one parochial high school and six parochial elementary schools exist within the boundaries of the school district. Stevens Point is located almost precisely in the center of the State of Wisconsin, and the school district has in excess of 396 square miles of territory located in Portage County. Our school buildings range in age from the oldest being constructed in 1922 and the newest just finished in 1974. The newest school, the Plover-Whiting Elementary School, has been designated as one of the ten demonstration sites for the American Association of School Administrators' Saving School House Energy Project. Additional reference may be made to that school, plus the Jackson Elementary School completed in 1967, elsewhere in testimony before this committee.

Wisconsin

Public school districts in Wisconsin enroll an excess of 964,000 students. Additionally, non-public schools enroll in excess of 100,000 more. Wisconsin has 435 school districts, 200 with less than 1,000 students; 127 districts enrolling between 1,000 and 2,000 students; 80 school districts enrolling between 2,000 and 5,000 students; and 28 school districts enrolling more than 5,000 students. The City of Milwaukee, the largest school district, has an enrollment in excess of 100,000 students. Seventy-five percent of the school districts in Wisconsin enroll under 2,000 students (3).

Wisconsin is located in the northern tier of states in the Upper Midwestern section of the United States. Being located in the north central U.S., Wisconsin experiences a relatively cool climate. The mean temperature state-wide for the 1969-73 period was 44 degrees Fahrenheit (4). The temperatures range from a low of 10.4 degrees Fahrenheit for the month of January in the northwest part of the state to a high of 71 degrees Fahrenheit for the month of July in the southeast part of the state.

Although Wisconsin is not considered generally to be one of the larger states, it did rank 13th in overall usage of electricity, 13th in usage of gas, 24th in usage of fuel oil, and 8th in usage of coal, in the nation in 1971 (4).

Although the statistics provided for Wisconsin speak to only one state, inference could be made directly to the states of Illinois and Michigan, both of which consume considerably more energy than Wisconsin, and to Minnesota and Iowa and perhaps other states of similar climatology in the Upper Midwest. It is likely that these states and others would be very similar in the problem facing the schools in energy conservation because of climate and because of the nature of construction and age of school buildings.

Mr. Thomas Schmidt, Rhode Island Commissioner of Education (5), has presented testimony before this committee for his state citing the situation there. His statements generally support what we find in Wisconsin. While supporting data was not readily available, it appears to be a safe assumption that the Upper Midwest Region experiences a generally similar situation.

In this time of rapidly increasing costs and attempts by state officials to control expenditures of local school districts, many states have experienced some kind of a levy limit or cost control. Wisconsin is no exception. State law requires that school districts' operational budgets increase no more than $9\frac{1}{2}$% per pupil in any given year. Fortunately, increased energy costs are exempted from computation of the cost ceiling, but unfortunately maintenance costs and remodeling or retrofit costs are not. Therefore, school districts are not encouraged to make investments of local funds in improving efficiency of building operations to save energy expenditures.

Wisconsin has a requirement that any long term borrowing for capital improvement be approved by a referendum of people. The success of bond referenda in Wisconsin probably doesn't vary much from the experience elsewhere n the nation. Obtaining a favorable vote is most difficult. Later in the ecommendation section of this presentation, I wish to comment on difficulties that school districts may have in raising matching funds as prescribed under S701.

Energy Savings in Stevens Point, 1973-Present

Significant alterations have been achieved in energy usage patterns within the Stevens Point district since the plight of the nation's energy came into public focus in 1973. Initially we engaged in the common sense, voluntary cutbacks such as uniformly setting thermostats at 68°, turning off unused lights, shortening heating cycles, monitoring exterior doors, engaging in a district wide program of filter changes and motor maintenance, cutting down hot water temperature, and trying to increase general awareness among our students and staff.

Key to the achievement of significant reductions was the establishment of a careful record keeping system of energy usage by each building. Usage patterns where converted into degree day comparisons in order to determine if energy saving practices were being carried out on a continuing basis by the personnel using the buildings. Through comparison of energy usage building by building, many gross abuses were discovered and immediate remedies implemented to conserve energy. In one school, for example, it was found that an outside air inducing fan was not wired through the program clock and was operating 24 hours a day. In other buildings, air dampers were stuck open or stuck closed resulting in imbalances in the heating system.

Figure 1 is the three year eight month comparison of energy usage for the Stevens Point School District. During that period the total square footage in use

ENERGY SAVINGS 1973 - PRESENT

	1973-74	1974-75	1975-76	1976-Present*
Heating Square Foot	913,153	981,787	981,787	981,787
Gas Used				
Cubic Feet	1,134,941	1,056,793	854,450	602,593
Therms	1,157,640	1,077,929	871,539	614,645
Usage in Therms per Square Foot	1.267	1.098	.887	.626
Heating Costs				
Dollars	$91,454	$91,624	$96,741	$88,509
Per Square Foot	$.10	$.09333	$.098	$.090
Degree Days	8,578	8,776	8,470	7,338
Usage in Therms per Degree Day	134,954	122,827	102,897	83,761
Cost per Degree Day	$10,661	$10,440	$11,421	$12,061
KWH	5,552,825	5,087,765	5,016,580	4,945,771

* 8 months only

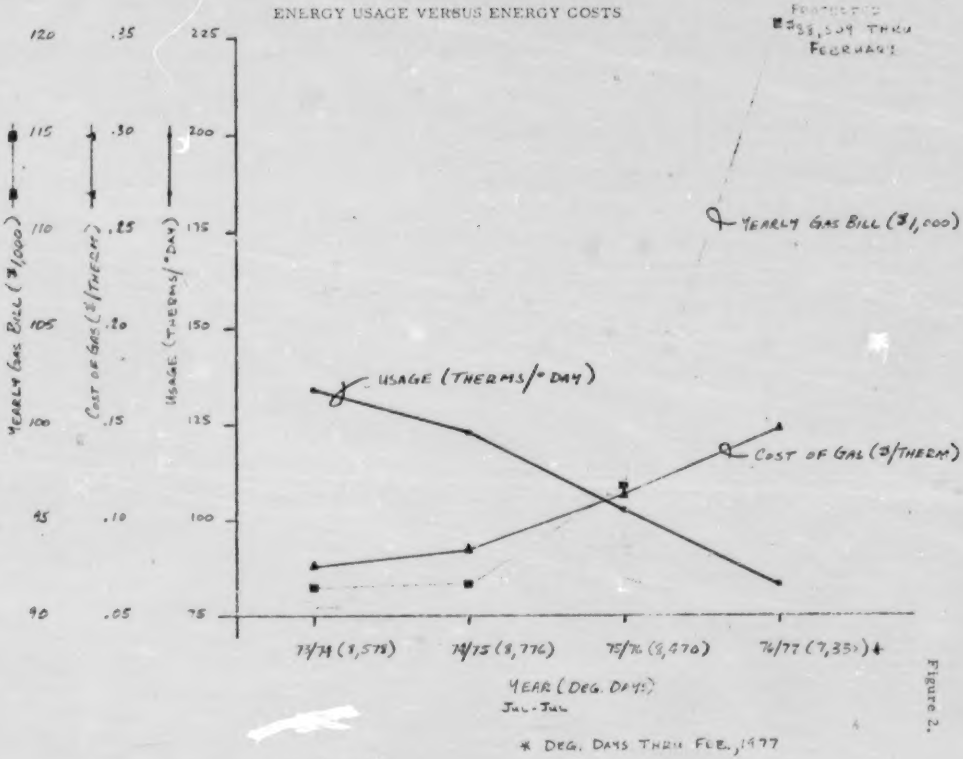
Figure 1.

increased 7½%, while at the same time total therms of natural gas used decreased 27%, resulting in a therm per square foot reduction of 32%. Heating costs per square foot are down only 10%. However, most significant is a reduction of 37% in therms per degree day over this period. Cost per degree day at the same time increased 13%. An overall reduction in electricity usage during that same period was 11%. The estimated savings reduced to degree day equivalents for the first eight months of this school year is in excess of $66,000 as compared to 1973 consumption rates.

Figure 2 contains a graphic presentation of the costs of natural gas compared with the usage reduction achieved during this period. The net effect for our school district has been that the reduction in usage has, for all practical purposes, kept pace with the increase in cost so that total dollar expenditures for energy in the school system have not increased dramatically.

It became evident during this process that personnel within our district did not possess the necessary expertise to affect significant long term reductions that could maximize energy savings. Therefore, we contracted with an outside consulting firm to engage in recalibration within some of the buildings.

Figure 3 shows a three month cost savings at the Jackson Elementary School based on recalibration of the automatic temperature control system. The consulting firm surveyed our district and identified those buildings in which the largest initial savings would likely result. Those recalibration efforts were undertaken. The cost of the recalibration at Jackson School was $1200. On a month by month comparison, the usage of natural gas at Jackson School was reduced from 7.2 therms per degree day to 5.4 therms per degree day solely by recalibration. This savings was in addition to those voluntary savings already



ENERGY USAGE VERSUS ENERGY COSTS

* DEG. DAYS THRU FEB., 1977

Figure 2.

Figure 3

Three month cost savings based on recalibration

Jackson School
46,600 sq. ft.

12/75	7,648 Therms 24,800 KWH 1,452 °days 5.267 Therms/°day	*12/76	7,955 Therms 23,680 KWH 1,694 °days 4.695 Therms/°day
1/76	11,096 Therms 23,040 KWH 1,641 °days 6.76 Therms/°day	1/77	8,974 Therms 21,120 KWH 1,899 °days 4.725 Therms/°day
2/76	12,100 Therms 27,360 KWH 1,202 °days 10.066 Therms/°day	2/77	9,393 Therms 24,000 KWH 1,312 °days 7.159 Therms/°day

12/75 thru 2/76	30,844 Therms 4,295 °days 7.181 Therms/°day
12/76 thru 2/77	26,322 Therms 4,905 °days 5.366 Therms/°day

$ saved = (75/76 usage rate) x (76/77 °days) - (76/77 Therms) x ($/Therm)

= (7.181) x (4,905) - (26,322) x ($.1758) = $1,564.76

Cost of recalibration was $1,200.00

* ist billing period after completion of recalibration

undertaken by district staff. During that three month period, the dollar savings, as equated per degree day, was $1565, resulting in a less than three month payback for the recalibration effort. The recalibration brought the system back to original design conditions but did not change the original specifications.

It became readily evident that recalibration should be considered for the remainder of the buildings in the district and of this moment that effort is under way. One of the difficulties encountered is matching recalibration expenses to the budget year to make sure that the payback period occurs in the same year so that artificial expenditures don't appear.

The experience in our district for the past 3½ years is not atypical of those districts that made an earnest effort to reduce energy consumption. Most significant was our ability to reduce therms per degree day consumption of natural gas by 37%. Key to any successful energy saving effort is careful documentation of usage and conversion to comparable statistics so that the whole process can be monitored carefully. If this necessity exists in our school system, it would be my judgment that in order for the nation to achieve maximum energy savings a national monitoring system would also be necessary.

Projections for the Future

Our own initial efforts and the recalibration of a few of the heating systems clarified the need to engage in significant alterations in the future. For our purposes, three categories were identified: (1) continuation of the recalibration effort; (2) modifications to the heating, ventilating and air conditioning systems; (3) insulation.

Modifications of the H. V. A. C. system would include installation of optimal start programmers which would measure outdoor air temperatures and reprogram start time to allow adequate ventilation starting one hour after occupancy; redesigning air systems for normal usage rather than maximal usage, with options for conversion to maximal usage; resetting cold deck temperatures to zone demand to balance the difference between cold deck and hot deck temperatures and make sure that all existing equipment is operating at peak efficiency.

About two years ago infra-red pictures of our facilities were taken, both from the ground and from aircraft, to determine locations of heat loss. As a result of this effort, plus a survey completed by an insulation firm, quotations have been obtained for a long term insulation effort.

Figure 4. Benefits of Future Modification

	Cost	Savings Per Year	Payback
Recalibration	$ 10,000	$ 10,000	1 year
H. V. A. C. Modifications	$ 75,000	$ 25,000	3 years
Insulation	$ 94,500	$ 20,800	5 years
TOTAL	$179,500	$ 55,800	

The entire cost of completing recalibration of the buildings within our district is estimated at $10,000 with less than a one year payback period. The total cost can be recovered within one heating season. The H. V. A. C. modifications would cost an estimated $75,000 with a $25,000 annual savings based on current rates of energy costs for a three year payback period. The insulation estimate for the district is $94,500 with a savings per year of $20,800, resulting in a five year payback period. Converting annual savings to therms at existing rates, a net reduction in energy usage of 317,000 therms per year would result from completion of recalibration, H. V. A. C. modifications, and insulation. Total cost to the district would be $179,500, with a payback period for the total package of less than five years. Projecting potential additional rate increases, the payback period could be reduced substantially, perhaps to four years or less. Total annual savings would be approximately 37%, which is well within the estimates made nationally for energy conservation for schools.

An example of long term savings is Benjamin Franklin Junior High School; a junior high school completed in the mid 1960's with an enrollment of 1,000 students. The actual bid obtained from a consulting firm to make the H. V. A. C. modifications which would adjust start up time, adjust gymnasium heat, adjust hot water circulating pump running time, and reset hot and cold deck temperatures from zone demand would cost $12,546. The anticipated savings would be $6,290, resulting in a two year payback period. Recalibration for this building will be an additional $2,000 with an estimated payback period of no more than one heating season.

Our projections, based on accurate estimates, indicate that if our district were to expend $179,500 this coming year, a 37% total savings, in addition to the 37% already encountered, would occur, for a total of 74% over 1973. Sixty-two percent of that savings would occur because of recalibration and modifications to the heating, ventilation, and air conditioning systems, with a payback period of three years or less. Thirty-eight percent would accrue because of insulation with a payback period of up to five years.

It seems clear that any dollars available should be placed into recalibration and readjustment in addition to controls for existing systems as a first priority; then consideration be given to insulation as a second priority.

Recommendations

Examination of the draft of S701 and comparison with the experiences to date in Stevens Point lead to the following comments and recommendations:

1. Basic grants versus low interest loans. It is recommended that the committee consider the viability of short term, low interest or no interest, loans to school districts by the federal government. These loans should finance energy conservation practices that would have immediate impact with very short term payback periods. It would seem that the availability of money on a loan basis, which could be paid back out of future energy savings, would benefit the local district because it would not have to consider the money as though it were a long term debt for a bond purpose (this requirement would vary from state to state) and the federal government would not have to make permanent allocations of funds and could use federal dollars on a revolving basis over a period of several years.

Laws regulating school budgeting and spending limits vary from state to state, but most school districts have difficulty in obtaining permission from the voters, or in qualifying under other state laws, for long term capital improvements. If the payments on a short term note to the federal government were made from energy savings, then the improvements to the school buildings would not raise the budget of school districts, and after a short period the actual expenditure level would be reduced.

In Wisconsin, school districts are prohibited from engaging in long term borrowing without a referendum of the people. However, the intention of that law was for capital improvements of major proportions. It might require special legislation to allow school districts to receive federal monies on more than a two year payback basis, but I'm certain that obtaining that legislation for this purpose would not be difficult.

If the committee were to consider low interest loans, it must be remembered that there is 5% money available, at least in small quantities. Therefore, the interest rate, in order to be competitive, would have to be somewhat lower than that. I recommend that the committee reconsider the basic grant concept for capital improvement and consider either going to no interest loans or a combination of programs that would let states determine which was the most effective way to administer energy conservation efforts within their existing statutes.

2. Demonstration grants versus dissemination efforts. Our experience has been that when the combined resources of private industry and governmental agencies are considered that adequate information now exists to make significant changes in energy usage in school buildings. Our conclusion is that substantial sums placed in further demonstration projects would not be as productive as placing similar amounts either in technical assistance or in information dissemination efforts. The AASA demonstration project, previously discussed before this committee, has given substantial direction to school districts desiring to conserve energy in a variety of school buildings in various locations throughout the country.

Therefore, I would recommend that additional demonstration efforts be minimized in favor of information dissemination and increased technical assistance.

3. Technical assistance. It is felt, on the basis of experience in Stevens Point, that maximum, immediate short term benefit would be achieved by high emphasis on technical assistance to school districts. In Stevens Point, because of the size of our school district, we have been able to employ three full-time

maintenance people and a full-time supervisor of buildings and grounds. All four of these persons have received training in energy conservation measures and in the adjustment of mechanical equipment. Not very many school districts in Wisconsin can afford this kind of maintenance staff.

As has been previously reported, expenditures of small sums for making adjustments in existing equipment has enabled our district to save substantial sums of money. It is felt that the same situation exists throughout, not only in Wisconsin but certainly in the colder climates of the country if not universally. It would appear that approximately three-fourths of the school districts in Wisconsin, enrolling less than 2,000 students, would be too small to employ personnel who are technically competent to maximize energy savings. These districts can engage in the most superficial changes in operating procedure, but to analyze the efficiency of their air handling systems and to alter those systems would probably be beyond their capability. In fact, in our particular case, we found it necessary to contract with a private consulting firm in order to accomplish desired changes.

I further recommend that such technical assistance be furnished in the most expeditious manner to school districts involving a combination of government and private industry efforts. Our experience has been that both state and federal governmental agencies lag considerably behind private industry in possessing necessary expertise to provide technical assistance to school districts. Prior to contracting with a private firm to engage in recalibration, we explored the availability of assistance from both the state and the regional offices of the federal government. None were able to provide the needed assistance.

It appears if the purpose of this bill is to maximize energy savings on a short term basis, contracting with existing firms already familiar with energy conservation measures would result in the best use of available funds.

Another factor that should be considered in the technical assistance portion of the bill is whether it is most efficient for the federal government to deal directly with school districts or whether state education agencies should be involved. Our experience is that state departments of education, and Wisconsin is no exception, require a lengthy time to gear up to handle a project of this scope. If the Congress is sincerely interested in seeing a major change at the local school district level, it would seem to me that the fewest layers of bureaucracy that are superimposed between the will of the Congress and the change of the thermostats in the classroom will result in the quickest results.

The consumption of energy in the nation and its shortage has reached emergency proportions. Such niceties as a balance between the powers of the state and the federal government, when the good of the nation is being considered, should not be of prime consideration. If the federal government were to appropriate funds directly to local school districts, carefully monitor the results, and quickly make changes based on additional data, the largest quick energy savings would result. If each state is responsible for developing a plan, having it approved, and then soliciting local school district applications, it could delay as much as a couple of years the impact federal money would have in local school districts. I recommend that a comprehensive national energy policy be developed for public schools. The policy should be administered directly by the federal government and be mandatory for all schools.

4. Allocation by population. It appears that because of the pattern of energy usage throughout the country that allocation of monies for energy conservation for schools by population may not result in the largest immediate energy savings. It is recommended that patterns of energy usage be incorporated into any allocation formula to make certain that the largest savings result for the dollar invested.

5. Elementary and secondary versus higher education. Assurances should be given that public schools would receive a fair share of the allocation as opposed to higher education institutions. The public school system is diverse, decentralized, and far-flung. Because of the diversity of organization, reaching public school systems may be more difficult than reaching institutions of higher education. There are approximately ten times more school districts than there are colleges and universities in the country. Also, if S701 becomes law, this act would be the only source of assistance available to local school districts, while institutions of higher education have other sources available to them.

6. Grantsmanship of small districts. It would be readily agreed that the largest initial energy savings could be obtained from large school districts where a centralized administration can have the resource base to employ their own expertise or to contract with outside firms. Also policies can be uniformly applied to larger numbers of buildings, affecting more students with a resulting larger savings in energy.

However, after a certain point, smaller districts may not have the ability to engage in their own conservation practices and also they may not have the ability or the information to apply for grants or loans to accomplish the desired changes. Care must be taken to make sure that the thousands of small school districts that may have only one or two buildings, but form a substantial number of schools throughout the nation, are able to avail themselves of the resources as intended in the act. It would seem that direct involvement by the federal government through regionalized offices could provide efficient assistance to local districts in determining their needs and in determining the most effective practices for energy conservation.

In summary, the energy problem is a national problem. Public school districts, forming one of the largest loosely knit organizations in the nation, are large consumers of energy. Because of the diverse nature of the governing structures of schools, attacking an energy waste problem on a national level will require considerable centralized thrust and direction. It seems most appropriate that the Congress should take a firm lead in assisting local districts in conserving energy (perhaps even requiring them to adhere to certain practices). From the point of view of one school district superintendent, it seems to me that the most useful direction would be for a national energy policy to be developed and backed up by federal assistance and guidelines in order to divert what appears to be an impending energy disaster.

If the federal government were to loan Stevens Point $179,500 today, we could affect a 37% permanent reduction in energy usage and pay the money back within five years. That reduction, in addition to the efforts we have already made, would result in a net reduction of 74% since 1973. I sincerely hope Congress will act favorably on S701 and consider the changes proposed.

Mr. Chairman, and members of the committee, I appreciate this opportunity to appear before you on this most critical, national issue.

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3. Thompson, Barbara, State Superintendent of Public Instruction, State of Wisconsin, Wisconsin Public School Enrollments, 1975-76, Feburary, 1976.

4. State of Wisconsin, 1975 Blue Book.

5. Schmidt, Thomas C., Rhode Island Commissioner of Education, in a statement presented to the U.S. Senate Subcommittee on Education in a Hearing in Pawtucket, R.I., on February 14, 1977.

Senator **Pell**. I thank you for your support. We need it, incidentally, in order to try to get this bill through.

As a general rule, it takes several years to get a bill through. We want to try to get this through this year so we can make use of it in 1977-78.

We have another problem. If we get it through in the Senate, it has to get through in the House. We need the help of both parties right across the country if this is to be passed to be of any help to you in next year's winter.

I have not seen the Farmer's Almanac for 1978, but it could be as cold as this year.

Senator **Stafford**. I must say to Dr. Hansen that while I think it is very important that we not forget what happened last winter, that I am personally relieved that it is not just 20 above zero today.

Senator **Pell**. Amen.

I thank the panel very much.

Dr. **Hansen**. Thank you.

Senator **Pell**. Our next witnesses are Dr. Cavit Cheshier, executive secretary of the Tennessee Education Association, accompanied by Mr. Jim Green, assistant director for legislation, NEA.

STATEMENT OF CAVIT CHESHIER, EXECUTIVE SECRETARY, TENNESSEE EDUCATION ASSOCIATION, ACCOMPANIED BY JIM GREEN, ASSISTANT DIRECTOR FOR LEGISLATION, NATIONAL EDUCATION ASSOCIATION

Mr. **Green**. I am Jim Green with the National Education Association.

We are delighted with the opportunity to testify this morning, and we commend you for the efforts in this area.

With the budget and appropriations process very active, and the administration working on energy policy, I think this opportunity to present education's problems that were brought on by the effects of the severe weather and energy shortages are most timely.

We have asked our research division to make a survey of all the States, to give us the effect of energy shortages and severe weather upon teachers in their teaching activities across the country.

I would like to file with the committee early next week the summary of this survey so that it will be on record.

[The information subsequently supplied follows:]

SURVEY OF EFFECTS OF ENERGY SHORTAGES
AND SEVERE WEATHER UPON TEACHERS
WINTER 1976-77

NEA Research

March 1977

NEA State Affiliates were requested in mid-February to respond by March 1 to a questionnaire about the local effects of unusual energy and/or weather problems this winter. The responses are very general estimates from most states. In many states the information about numbers of school systems and teachers involved in severe weather/energy shortage school closings probably will not be available before the end of the school year. However, certain facts emerges.

1. Eighteen of the 45 states for which some information has been received have not experienced unusual school closings connected with severe weather or energy shortages (Alaska, Arizona, Colorado, Connecticut, Delaware, Hawaii, Idaho, Massachusetts, Montana, Nevada, New Mexico, North Dakota, Oregon, South Dakota, Utah, Washington, Wisconsin, and Wyoming). Several western states and Alaska report having an unusually mild winter.
2. Severe weather conditions alone led to unusually large numbers of school closings in 20 states.
   - In 4 states (Kentucky, North Carolina, Ohio, and Tennessee) weather had a significant impact with loss of an average of more than 5 days in many school systems. In Kentucky, North Carolina and Tennessee, 52,450 teachers lost an average of 10.4 days as a result of severe weather conditions.
   - In 12 states (Alabama, Illinois, Iowa, Kansas, Maine, Maryland, Mississippi, Missouri, Oklahoma, Pennsylvania, Rhode Island, and Vermont) severe weather required the closing of schools in many school systems for an average of 5 days or less.
   - In 4 states (Indiana, Louisiana, Michigan, and Minnesota) severe weather closed some schools for a number of days not yet known to the state education associations.

3. Energy shortage alone was the cause of significant numbers of school closings in Kentucky and Ohio, where 432 school systems were closed for an average of 9 through 12 days. Also, energy shortages alone were the cause of losing from 2 to 4 school days by some school systems in Alabama, Oklahoma, Pennsylvania, and Virginia.

4. A combination of severe weather and energy shortages led to the closing of at least some school systems in 10 states (Alabama, Florida, Georgia, Kentucky, New York, Ohio, Pennsylvania, South Carolina, Tennessee, and West Virginia). Loss of more than an average of 5 days was reported for 27 school systems in Kentucky employing 4700 teachers, which lost an average of 8 days, for some school systems in South Carolina which lost an average of 6 to 8 days, and for 63 school systems in Tennessee which lost an average of 16 days and employed 28,361 teachers.

5. The predominant response from the 27 states which have lost school days as a result of either energy shortages or severe weather or both is that the lost days should be made up.

   - In 13 states all days lost are expected to be made up.
   - In 5 states at least some of the school systems will not make up the days lost. In two of these states (North Carolina and Pennsylvania) a total of 30 school systems which employ 8,700 teachers probably will not make up the lost days but it is expected that there will be no reduction of teachers' salaries. Yet in Pennsylvania, 40 other school systems employing 20,000 teachers will not make up the lost days and teachers' salaries will be reduced. In Ohio nearly all of the school systems losing days probably will not make up all of the days lost and it is expected that there will be no reduction of teachers' salaries. In Illinois and Kentucky some days probably will not be made up and it is not yet known how many, if any, teachers will have a reduction in their salaries.
   - In the remaining 9 states the adjustments made in the school year are not yet known.

6. Seven states report there has been a need to change or override state laws or regulations as a result of the energy-weather crisis.

   - Two states (Kentucky and Ohio) report that there has been a change in the state policy directed to the latest date that schools must remain in operation.

   - Five states (Kentucky, Mississippi, North Carolina, Ohio, and Pennsylvania) report that there has been a change in the policy directed to the minimum number of days that schools must operate to qualify for receiving all budgeted state aid.

   - Four states (Kansas, Kentucky, Mississippi, and Tennessee) report that there has been a change in the state policy relating to the definition of a school day as it applies to policies about the total minimum number of days schools must operate.

   - Some other states report that they did not need to change these types of policies because their regulations already provided flexibility and/or alternatives available for interruptions of the duration being experienced.

7. The extent of local association involvement in decisions related to the response of school systems to weather-energy related school closings was reported by 14 of the 27 states having these closings.

   - In decisions related to school closing and opening dates related to energy-weather difficulties the local associations were involved to some extent in three states (Illinois, Kentucky, and Ohio), and were involved to little or no extent in the remaining 11 states (Alabama, Florida, Georgia, Kansas, Maine, Mississippi, New Jersey, North Carolina, Pennsylvania, Rhode Island, and Tennessee).

   - In decisions related to adjustments to contractual duties of teachers or school calendar for the remainder of the school year, local associations were involved to a great extent in Georgia, involved to some extent in 8 states (Illinois, Kentucky, Maine, New Jersey, Ohio, Pennsylvania, Rhode Island, and Tennessee), and involved to little or no extent in the remaining 5 states (Alabama, Florida, Kansas, Mississippi, and North Carolina).

   - Among the eleven states where adjustments were made in contractual and salary status of teachers when schools were closed, Pennsylvania reported that the local associations were involved to a great extent five states (Illinois, Kentucky, Maine, Ohio and Rhode Island) reported that local associations were involved to some extent, and 5 states reported that local associations were involved to little or no extent (Alabama, Flordia, Kansas, Mississippi, and North Carolina).

8. Ten states reported that their state has assigned priorities to various types of energy users to assure appropriate allocation of scarce energy resources this year (Georgia, Idaho, Illinois, Iowa, Kentucky, Maine, New Jersey, Ohio, Pennsylvania, and Rhode Island).

   - Public education was ranked among the "essential" users in three states (Georgia, Illinois, and Iowa).
   - Public education was ranked slightly below the "essential" users in five states (Idaho, Kentucky, Maine, New Jersey, and Pennsylvania).
   - Public education was ranked considerably below the "essential" users in Ohio and Rhode Island.

9. Seventeen states reported an estimate of the extent to which the increased cost of energy will affect bargaining for salaries, fringe benefits, support staff, improved staffing ratios, etc., for next year.

   - Four states reported an estimate that these factors will have major impact: It will be difficult to hold the line or improve these items (Georgia, New Jersey, Oklahoma, and Rhode Island).
   - Nine states reported that these factors will have some impact: While there will be difficulties it is likely that normal improvements will be achieved (Colorado, Delaware, Iowa, Kansas, Kentucky, Maine, Massachusetts, North Carolina, and Tennessee).
   - Four states reported that these factors will have little or no impact (Illinois, Mississippi, Pennsylvania, and Vermont).

10. Suggestions for consideration by NEA in representing the interests of teachers affected by energy/weather-related school closings this year are listed below and in Appendix A.

    - See that state governments adopt energy plan whereby public education is among the essential users.
    - Consider the impact on NEA members as consumers as well as school-related problems.
    - Special rates (or federal rebate) offsetting high fuel costs might relieve burden on taxpayer.

- If school calendars change so should higher education so members may continue classes, etc.
- Federal granst should be made for changes in buildings necessary for efficient energy use.
- Urge a one-time federal appropriation to assist local school systems that have been hit by unusual and unexpected high utility bills due to the severity of the winter.
- Negotiate alternative calenders with agreed-upon criteria for implementation.
- Teachers should be paid for any lost dyas or be allowed to make them up.
- If school calendars are to be changed it must be bargained.

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W. S. Graybeal
NEA Research
March 8, 1977

Mr. Green. I would also like to present today Dr. Cavit Cheshier from the State of Tennessee, who is executive secretary of our State association, to give you some of the details as it is affecting the locals within the State of Tennessee. He represents a State that has a large urban center and also many rural areas. He also is involved both in a heat problem in the summertime and cold weather in the winter.

Dr. Cheshier.

Dr. Cheshier. Thank you, Mr. Green.

Mr. Chairman and members of the committee, it is a privilege to be here today on behalf of the 43,000 teachers in Tennessee who belong to the Tennessee Education Association, on behalf of the 850,000 students who are in school, as well as to the general public.

The most unusual winter of 1976-77 and the natural gas shortage have combined to place unusual hardships on the public schools of Tennessee.

As you know, we are a border State between the cold weather of the North and the warm weather of the South. Consequently, the extremes either way cause severe problems with us.

The extreme weather this winter is exemplified by the fact that January was the coldest January in the 107-year history that official weather records have been kept in Nashville. I would like to list for you some of the results from this winter and its ally, the fuel shortage.

One: Schools have been closed an unusual number of days. On February 8, the number of days ranged from a low of 2 in one school system to a high of 31 in one school system. Forty-nine of the 147 Tennessee school systems have lost 20 or more school days thus far this winter. These closings affect every school system in Tennessee, including over 46,000 teachers and approximately 850,000 students, plus some 20,000 other school employees.

Two: These lost days are resulting in many disruptions and changes such as:

a. Unusually late closings of the school term. Many school systems will close in mid or late June rather than their normal May date.

b. Spring vacations are being canceled.

The Tennessee Education Association has canceled its annual convention for the first time in over 100 years.

d. Colleges are being forced to defer the opening of their summer sessions so as to accommodate teachers who plan to attend summer school, plus graduating seniors who plan to enroll.

e. Extended school days and Saturday classes are being scheduled to make up lost time.

f. Possible State legislation to shorten the minimum 175 day school term is being considered.

Three: The financial impact of both the cold and the school closings is reaching a severe stage. Some examples are:

a. Many teachers must hold summer jobs to supplement the 10 months' pay as a teacher. However, as the last half of May and much of June is now being consumed with makeup schedules, this supplementary income is being preempted. The loss of supplementary income to many heads of households will reach the critical state. This is especially true when the average salary is only $11,277 for the entire instructional staff.

b. The cost of fuel to heat our homes has greatly increased over last year. This second blow to the teacher's budget is likewise critical.

c. The cost of fuel to heat the schools is far more than most school system's budget had projected. This money must come from somewhere, but now no one knows where. To illustrate: For January 1976, Bedford County's heating bill was $21,055 as compared to $39,933 in 1977. In Memphis, our largest school system, the 1976 figure was $204,000 compared to $276,000 this year. Memphis anticipates a total heating bill of $4,750,000 for this year compared to $2,860,000 last year.

d. Not only has the price of fuel increased sharply, plus a near double in the price of the emergency supplementary allocation, but the unusually cold weather has demanded a much larger amount than usual.

e. Even when schools were closed, the fuel costs remained near normal because of the unseasonably low temperatures.

f. The problem was aggravated due to a lack of insulation, thermopane glass, and the absence of double-entry doors. This is especially true in the older buildings, and in many school systems, 50 percent or more of their buildings are over 25 years old.

g. Many school superintendents report that it is almost as costly to heat the buildings at 50, or 55, or even 60 degrees, which is the lowest thermostat settings possible in most instances, on days when schools are closed as at a more comfortable temperature on the same day when the classrooms are filled with students.

Four: The aftereffects of students attending school at subnormal temperatures contributed to the influenza, reaching epidemic stages in some of our communities. Absenteeism from flu again closed some schools or is diminishing the amount of State money to be allocated on an average daily attendance basis if they remain open.

Five: A yet unrealized expense will be unanticipated air-conditioning costs next June as schools remain open into the summer to complete this school year.

Most homes are air-conditioned. Most businesses are air-conditioned. Most cars are air-conditioned. Children who live in this climate and then come to a hot school will have reduced their learning capacities.

Of course, it is impossible at the moment to identify added expenses of such things as frozen pipes and equipment, resurfacing of paved areas, damage to schoolbuses and such items as loss of income in athletic and school activities which many schools depend upon to supplement their programs.

The many interruptions, uncomfortable temperatures, postponed classes and extension of tests—this came just as midseason tests were pending—outbreaks of flu, the general uncertain conditions have all converged to mitigate against us having as good a school year as we otherwise would have had so far as quality of education is concerned.

I would like to add another point. It seems maybe insult has been added to injury when education is given low priority on fuel allocations.

In a conversation with one of our public service commissioners, I was told at a meeting he was in that, in many communities, before those communities could have the emergency allocation of fuels, schools had to be closed. Schools were not considered essential.

As a result of this, one of the tests is the fact of whether students were out of school. If they were, energy was made available to heat homes. If they were not, emergency allocations were not available.

This is a concern to me as a parent, and as a citizen, and as an educator.

The added expenses of this winter will also result in problems for next year. We are already seeing, because money must come from somewhere, and the local revenue being made available we anticipate will be much harder for such items as operation and maintenance, textbooks, instruction supplies, and teacher salaries with anticipation that another winter may follow this one, and we are finding local communities are now tightening the belt to provide funds for these other areas that are very important.

Disasters are not new in education. Disasters are not new in this Nation.

Thanks to the Federal Government, procedures have been established that communities and people can cope with disasters that have faced them.

Unfortunately, we find no answer to the disaster, financially speaking, that we have faced during this past winter. It is for this reason that I commend this committee for what it is doing, for your foresight, because we need your help, and your guidance, and your assistance, and resources of the Nation so that education cannot continue to be hampered because of these unforeseen problems.

In summary, I would like to ask this committee to seriously consider if it is appropriate to make recommendations leading in three possible areas.

First: We would like to suggest that you consider recommending ways that Federal funds can be channeled into school systems which have suffered such disasters as brought about by 1976–77 winter.

Secondly: I would like to suggest that you consider placing education in a higher priority in future fuel allocation policies, as well as considering the placing of ceilings on rapidly increasing prices when such circumstances exist. These circumstances, about after budgets have been formulated.

Thirdly: Your interest and recommendations so far as designs and possible funds for adequately insulating both existing school buildings and those yet to be constructed to be a long-range answer to the problems we face.

Your interest and attention to these matters is very deeply appreciated. I know your efforts will be well spent for the future of our schools as well as for the future of our nation.

Mr. Chairman, I thank you very much for this opportunity.

Senator Pell. Thank you very much.

I think, quite honestly, that it will be hard enough to get Federal money to help for the future, and that we will not be getting any retroactively.

I think the problem will be to try to make sure that schools are improved for the coming cold winters. As far as allocation goes, fuel allocation policies, I agree with you on that. I have spoken publicly on that.

I agree with you about designs and funds for adequately insulating existing school buildings and those yet to be constructed. That would come out of this bill provided some money for research and demonstration purposes is appropriated.

Going to air-conditioning for a moment, I am a little bit disturbed at your thought that this is a proper expense.

As we face the fuel crisis, should we not return to the idea that schools should be constructed so that air-conditioning is not necessary. They might have fans, or not be too much exposed to the sun, et cetera, rather than keeping them at a cool temperature artificially?

Dr. CHESHIER. Of course, many facilities which are already constructed did not have those ideas in mind. As a result, they are extremely hot and uncomfortable.

There are many thoughts in our area of the country, fewer windows, less glass exposure, is a more economical way to construct buildings, and there must be better ventilating and cooling systems if this happens. This, compounded with the climate in which children are reared, and again a large percentage live in air-conditioned homes, businesses, and otherwise, and we do have also a great number of summer programs that do exist in July and August, supplementary enrichment, these types of programs.

I do recognize the point you make. It is a trend which will have to be turned around, however.

We are both extremes. We are in a section where it is not very unusual at all for the temperature to be in the eighties and nineties quite frequently in the summer. In the winter, it is very common that our temperature will reach the teens and occasionally below zero. We have two extremes. These are serious problems, and I think it will take a change of philosophy of the contractors, the architects, and the parents, and all of us.

Senator PELL. I think, particularly, it would be good if some of these ideas were spread around in the architectural schools.

I am not sure I agree with you that temperature extremes produce flu. I think you find less flu in the European countries where there are tremendous extremes.

Dr. HANSEN. Maybe I should elaborate.

The reasoning thought by him was the fact that children stayed home during the day, in more comfortable temperatures. And when the schools were kept at 60 and 65 degrees, many parents did not send them properly dressed, and their feet stayed cold all day.

As a result of this, they were compounding the problem.

Senator PELL. The simplest way of eliminating flu would be if everyone wore those little gauze masks. No one wants to do that. It is exposure more than temperature.

Thank you very much indeed.

Dr. CHESHIER. Thank you for your time and attention.

[The prepared statement of Dr. Cheshier follows:]

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GOVERNMENT RELATIONS

NATIONAL EDUCATION ASSOCIATION • 1201 16th St., N.W., Washington, D.C. 20036 • (202) 833-5411
JOHN RYOR, President
TERRY HERNDON, Executive Director

STATEMENT OF

CAVIT CHESHIER

EXECUTIVE SECRETARY

TENNESSEE EDUCATION ASSOCIATION

AN AFFILIATE OF THE

NATIONAL EDUCATION ASSOCIATION

ON

SCHOOL ENERGY COSTS

BEFORE THE

SUBCOMMITTEE ON EDUCATION

OF THE

SENATE COMMITTEE ON HUMAN RESOURCES

MARCH 11, 1977

TENNESSEE EDUCATION ASSOCIATION
598 JAMES ROBERTSON PARKWAY NASHVILLE TENNESSEE 37219 615 242 8392
ADVANCING THE CAUSE OF EDUCATION

STATEMENT TO THE EDUCATION SUBCOMMITTEE
UNITED STATES SENATE, WASHINGTON, D. C.

Mr. Chairman, Members of the Committee:

I am Cavit Cheshier, executive secretary of the Tennessee Education Association. On behalf of our 43,000 members, I want to express my deep appreciation for your looking into this most important topic and also for allowing me the privilege of coming before you.

The most unusual winter of 1976-77 and the natural gas shortage have combined to place unusual hardships on the public schools of Tennessee. As you know, we are a border state between the cold weather of the north and the warm weather of the south. Consequently, the extremes either way cause severe problems with us. The extreme weather this winter is exemplified by the fact that January was the coldest January in the 107 year history that official weather records have been kept in Nashville. I would like to list for you some of the results from this winter and its ally the fuel shortage.

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2. These lost days are resulting in many disruptions and changes such as:

a. unusually late closings of the school term. Many school systems will close in mid or late June rather than their normal May date.

b. spring vacations are being canceled.

c. the Tennessee Education Association has canceled its annual convention for the first time in over 100 years.

d. colleges are being forced to defer the opening of their summer sessions so as to accommodate teachers who plan to attend summer school, plus graduating seniors who plan to enroll.

e. extended school days and Saturday classes are being scheduled to make up lost time.

f. possible state legislation to shorten the minimum 175 day school term is being considered.

3. The financial impact of both the cold and the school closings is reaching a severe stage. Some examples are:

a. Many teachers must hold summer jobs to supplement the 10 months pay as a teacher; however, as the last half of May and much of June is now being consumed with makeup schedules, this supplementary income is being pre-empted. The loss of supplementary income to many heads of households will reach the critical state. This is especially true when the average salary is only $11,277 for the entire instructional staff.

b. The cost of fuel has greatly increased to heat our homes over last year. This second blow to the teacher's budget is likewise critical.

c. The cost of fuel to heat the schools is far more than most school system's budget had projected. This money must come from somewhere but now no one knows where. To illustrate: For January 1976, Bedford County's heating bill was $21,055 as compared to $39,933 in 1977. In Memphis, our largest school system, the 1976 figure was $204,000 compared to $276,000 this year. Memphis anticipates a total heating bill of $4,750,000 for this year compared to $2,860,000 last year.

d. Not only has the price of fuel increased sharply, plus a near double in the price of the emergency supplementary allocation, but the unusually cold weather has demanded a much larger amount than usual.

e. Even when schools were closed the fuel costs remained near normal because of the unseasonably low temperatures.

f. The problem was aggravated due to a lack of insulation, thermopane glass, and the absence of double entry doors. This is especially true in the older buildings, and in many school systems fifty per cent or more of their buildings are over 25 years old.

g. Many school superintendents report that it is almost as costly to heat the buildings at 50 or 55 or even 60 degress, which is the lowest thermostat settings possible in most instances, on days when schools are closed as at a more comfortable temperature on the same day when the classrooms are filled with students.

4. The after effects of students attending school at subnormal temperatures contributed to the influenza reaching epidemic stages in some of our communities. Absenteeism from flu again closed some schools or is diminishing the amount of state money to be allocated on an average daily attendance basis if they remain open.

5. A yet unrealized expense will be unanticipated air conditioning costs next June as schools remain open into the summer to complete this school year.

6. It is impossible to identify all of the added expenses such as repair of frozen pipes and equipment, resurfacing paved areas, damages to school buses, and loss of income in athletic and other school activities.

7. The many interruptions, uncomfortable temperatures, postponed classes and tests, outbreaks of flu, and general uncertainty have all converged to undoubtedly mitigate against the best quality of education our school systems are able to provide this year.

8. One final points needs to be made. Insult seems to have been added to injury when education is given a law for fuel allocation. As reported to me by a public service commissioner, many communities could not get the supplementary allocation unless they closed the schools because schools were not considered essential. As parents, it seems something is wrong when other places remain open and schools must close.

The added expenses of this winter will also result in less local money being available next year to meet increasing costs in such areas as operation and maintenance, textbooks, instructional supplies, and even teachers' salaries. Disasters are not new in this nation. Thanks to our federal government, many communities have survived because of financial assistance during such critical times. This winter has surely been a disaster in many ways.

for the Tennessee public school systems as well as the school systems for many other states.

I would like to ask this committee, if it is appropriate, to assist in three things:

1. Recommend ways that federal funds can be channeled into school systems which have suffered during disasters such as the winter of 1976-77.

2. Assist in placing education in a higher priority in future fuel allocation policies as well as considering the placing of ceilings on rapidly increasing prices when such circumstances exists.

3. Provide designs and possible funds for adequately insulating both existing school buildings and those yet to be constructed.

Your interest and attention to these matters is deeply appreciated and I know that your efforts will be well spent for the future of our schools as well as for our nation.

Thank you.

Senator PELL. Our next witnesses will be representing the AFT, Gregory A. Humphrey, codirector of legislation, and Mr. Dal Lawrence.

STATEMENT OF GREGORY A. HUMPHREY, CODIRECTOR OF LEGISLATION, AMERICAN FEDERATION OF TEACHERS, AFL-CIO, ACCOMPANIED BY DAL LAWRENCE, PRESIDENT, AFT NO. 250, AFL-CIO, TOLEDO, OHIO

Mr. HUMPHREY. I am Gregory Humphrey, codirector of legislation, American Federation of Teachers.

Accompanying me is Dal Lawrence, president of our Toledo Federation of Teachers.

We have both submitted testimony in advance to the committee. I would like to ask that the testimony be included in the record.

Senator PELL. Your statements will be included in full in the record and we will keep the supplementary material you have offered on file in the offices of the Subcommittee on Education, Arts and Humanities.

Mr. HUMPHREY. I would like to take a few minutes to summarize some of our points.

We welcome the bill introduced by you, Mr. Chairman, S. 701, as a needed step in the right direction to help schools overcome what has become in many cases a crisis, both for their budgets and for their operations over this past very brutal winter.

We would like to point out this is something that did not just occur this winter. But as we point out in our testimony, in the field of oil and other fossil fuels, not necessarily natural gas, something has already occurred that has driven the price up to three and four times what it used to be, and it has had an impact on school budgets that can only be characterized as devastating to the quality of education.

We believe S. 701, in providing emergency grants helping offset these, does serve a very useful purpose, and we hope the committee will pass it in some form.

I would like to say that in the long run the problems faced by the schools and energy are the problems faced by the entire society. That is, that energy costs seek a level that absorbs more and more budgets that are available, not just to the school district, but to families and other public services as well.

We believe one of the major things that the Congress can do over the next few years is to seriously investigate and come up with some recommendations and legislation in terms of dealing with what we believe is not just monopoly by energy companies but some absolutely irresponsible tactics in terms of seeking to deregulate.

The man who is accompanying me today can talk in greater detail about what is happening with Columbia Gas Pipeline in Ohio, how they have attempted to use the schools over a period of years to press the Congress for deregulation.

I would like to say, although it is not the jurisdiction of this committee, and we realize it is not the responsibility of this committee to investigate it, that in any report that you file that you begin to represent to the rest of the Congress some of the things that have happened by the natural gas producers in terms of trying to use the schools as a weapon in a larger fight, and that is a fight for deregulation.

I would now like to turn this over to Mr. Lawrence for a statement.

Mr. **Lawrence**. Senator Pell, I am Dal Lawrence. I am with the Teachers Union in the Toledo public school district.

My children are in that school district as well.

Columbia Gas Co. in Ohio supplies about 70 percent of the gas in the State of Ohio, and supplies 56 of our 88 counties. There has not been a single school building in the State of Ohio that Columbia supplies that has not been closed for at least 1 day because of the energy problems we have had this particular winter.

We have an enrollment of 54,000 students in the Toledo public school district. We have 64 gas-fired schools out of 75. There are some ironies in this story.

One is that the EPA required us, and of course threatened to fine us if we did not convert the schools from coal to natural gas. That conversion process took place from about 1971 to 1974.

By 1974, in fact, within days after the conversion process was finished, we began to get the first notifications from the gas company that gas was going to be in short supply. Not only did we get notifications that gas was going to be cut back, and it was subsequently cut back 40 percent of what we would normally use, we were also receiving letters that we should write to Congress and ask our Congressmen and Senators to deregulate the price of new gas at the wellhead, letters I have included with my testimony, and I will submit it to you.

We have had 2½ winters of schools where the temperature ranged from at best 68 degrees down to as low this winter as 38 degrees. It does not seem possible, but it is true.

A lot of other schools in Ohio had the same difficulty.

One of the things we found out is that the seat temperature in the school runs about 5 or 8 degrees colder than the thermostat temperature. You set the thermostat at 68 degrees, a typical elementary or high school building, the seat temperature for students will be somewhere between 60 and 62 degrees.

Senator **Pell**. Why is that?

Mr. **Lawrence**. There are a couple of factors.

One is that the buildings are not used over weekends so the walls get cold and the furniture gets cold. The wall temperature—well, the thermostat temperature will tend to reflect body heat, but the tables and the cold materials in the room will not.

We also found that keeping students in school makes about a 15 degree difference in the temperature, if you have the thermostat at 42 or 43 degrees, which we are doing for part of February, with students in the building, you can actually build up heat.

We were being asked this winter to take children out of schools entirely, not only being asked, we were sent a telegram and told to take them out. The telegram came from Columbia Gas of Ohio. They said if we did not take them out, they would shut off the gas.

Incidentally, in some schools, they did shut off the gas, not in Toledo, but in Ohio.

It is interesting because, in shutting off the gas, by taking students out of the school and closing it down, you do not save that much energy. For one thing, students go home and walk in the front door and the back door at the residence, and they still have to have what Columbia describes as maintenance level heat in the building itself.

Maintenance level heat, we found out one Saturday in one of our high schools where the heat was at 42 degrees, the Columbia people came out and told the school officials to lower the heat because that was too high, that was not the maintenance level at all.

We had $50,000 worth of damage to our 75 schools. We were closed a total of 10 days totally in the Toledo School District. We would have been closed longer than that except, quite frankly, we resisted in every way we possibly could, and the final way was we ultimately purchased a gas well in Ohio at $3 per cubic foot. Now, we are selling some of that gas to area school systems.

We had a January in Toledo where the average temperature was 9.7 degrees. We did not have a day above 32 degrees since December 26 until the last week of February. Some days, the chill factor was minus 30 degrees.

The school systems in Ohio were closed anywhere from 1 day to 4 weeks. We were asked to close for 4 weeks, and we got away with 9 days. We also closed our schools on December 3 because we ran out of money.

So our students, my children, did not get a full 5-day week of education from December 3 until the last week in February, either because of the energy or because of the fact that we ran out of funds.

In Ohio, we had 4,000 school buildings, 73 percent of them are heated by gas. Only 8 percent of them have alternative fuel capabilities.

Totally in the State, we had shut down 4,044 days for energy. We are also shut down 3,791 days because of hazardous weather. 158 districts closed in 10 days or more, and 29 districts in the State will run until the 17th of June and, in our case, will go to school until the 24th of June.

Another irony is that those same buildings will get on the third floor—I used to teach there—they will get up to approximately 8 to 10 degrees higher than the outside temperature, so we will have some schools where the temperature will run anywhere from 92 to 100 degrees on the top floor.

In conclusion, I would like to state that there is not much doubt in my mind that the gas company is using the schools, and in order to impress upon them the need for gas deregulation, we are quite upset in the State of Ohio with public utilities, in particular with Columbia Gas.

One other statistic I might mention is that in 1974–75 we had 779,481 absentees. Last year we had 814,650 absentees with about 1,200 fewer students.

Thank you, Senator Pell.

Senator PELL. Do you recommend any specific changes in this bill, S. 701?

Mr. Humphrey. No. We merely wish to say in this context, certainly the schools need this kind of support. And what we have to realize is that in the long run this kind of financial support for energy conservation by the Government can be an appetizer for the energy companies. That is what we believe is the overriding issue in all these questions of deregulation. That is what the goal of many of these pipeline companies really is.

When they cut back on schools, what they are really doing is using the schools to prove a point.

Senator Pell. Thank you very much for your information and supportive statistics.

Mr. Lawrence. We have some exhibits incorporated in the testimony, shall I leave these with you?

Senator Pell. They will be incorporated by reference. Thank you very much.

[The prepared statements of Mr. Humphrey and Mr. Lawrence and additional material referred to follow:]

March 11, 1977

TESTIMONY ~~OF~~
GREGORY A. HUMPHREY
CO-DIRECTOR OF LEGISLATION
AMERICAN FEDERATION OF TEACHERS, AFL-CIO
TO THE SENATE SUB-COMMITTEE ON EDUCATION ON
ENERGY PROBLEMS FACING EDUCATION

The current energy crisis has dramatically affected the quality of education in the United States. We in the AFT welcome the introduction of S. 701, we have long felt that the fortunes of "education" are intertwined with what goes on in the rest of the economy. We have carried energy votes as key education issues in our voting record. The report of the Federal Energy Agency pointed out the potential trade-offs that have been made in order to fund the increases in energy costs. Clearly, there must be an effort made to lessen the immediate impact on public education of runaway energy costs. S. 701 is a step in the right direction -- clearly, emergency help is justified.

First, any energy policy that hopes to succeed must stress energy conservation. But what is truly needed for education and for the rest of our society is an energy policy to solve long-range problems. Per capita energy consumption in the United States is twice that as such developed countries as, Sweden, Switzerland and West Germany. These countries have comparable standards of living to the U. S. Clearly, energy conservation does not have to mean a reduced standard of living -- it means using energy more efficiently. As the AFL-CIO Executive Council said last month, "It means the manufacture of automobiles that get more mileage per gallon of gasoline, the retrofitting of existing homes and buildings and the construction of well-insulated homes and buildings that drastically reduce energy consumption, the designing and building of home appliances that use only small quantities of energy. We welcome the provisions of S. 701 that seek to aid schools to implement some times costly energy conservation measures. As an example of what energy conservation can accomplish if gasoline mileage were doubled over the current average of 14 miles per gallon of gas, the nation would save more than three million barrels of oil per day. This exceeds the nation's oil imports from the Arab countries.

Nor does conservation mean no growth. We hold no brief for those pushing conservation as part of a no-growth philosophy. Growth in the economy and conservation of energy can, and must, go hand-in-hand.

Adoption of tough and stringent conservation measures could reduce the nation's energy consumption growth rate from 4 percent to well under 2 percent." However, while conservation is essential it will not, by itself, solve the energy problem.

Clearly, new sources of energy are necessary. Development of coal as a clean, safe fuel must proceed and other substitutes for oil and natural gas must be found.

One solution to the natural gas shortage that we strongly urge against, however, is the deregulation of supplies -- new or old -- from whatever source. If we may digress a bit, the current gas situation is reminiscent of exactly what occurred to the schools in 1974 with the oil crisis and the Arab embargo. A concrete example, mirrored throughout the rest of the United States, was seen in New York that winter. "No. 6" heating oil is used to heat most New York City schools. The fuel bill budget for the 1973-74 school year was set at $9.5 million, a price of 13.45¢ per gallon. In 1974, by mid-January, the price skyrocketed to 32.21¢ per gallon, a 145% rise midway through the heating season. This increase forced the New York City Board of Education to revise its heating costs upwards by $2 million to $11.5 million for the school year ending in June. The 1974-75 fuel bill for New York City was approximately $18 million. It has gone higher since Buffalo, New York found itself in a similar squeeze. Its schools are heated with "No. 2" and "No. 6" heating oils. In September, 1973, "No. 2" was selling at 18.70¢ per gallon and by January, 1974, it was 31.90¢ per gallon (a 70% increase). "No. 6" heating oil also skyrocketed from 12.15¢ per gallon in September, 1973 to 30.8¢ per gallon (a 14% increase). The original 1973-74 school year heating budget called for an expenditure of $467,000. Due to price rises the 1974-75 school heating bill was $1,594,000.

The story of gasoline for school buses is the same. A survey of twenty-one school districts by the New York State Department of Education showed that in September, 1973, bulk gasoline was priced at 15.85¢ per gallon, but by January, 1974 the price had risen to 23.814¢ per gallon (an increase of more than 50%) and everyone knows what has happened since then.

Lest anyone believe that the oil companies were making any attempt to moderate their demands in hardship situations, the New York experience proved the opposite.

Rather, there was a "scramble" to "get out of" contracts negotiated before the shortage and to shift supplies away from wholesale buyers onto the retail market. Additionally, the regulations promulgated by the Federal Energy Agency did little to help the wholesale purchaser. With respect to heating oil, the FEA regulations referred to base period levels and base period suppliers with the base period usually defined as the previous year. Many districts switched to new suppliers for the 1973-74 school year either because their traditional supplier did not submit a bid or because the bid was not the lowest (requests for bids go out each year). A number of contractors who were "new suppliers" claimed that their contracts put them in a confusing situation since they did not supply the districts in the base year, further, they claimed that the contracts violated the regulations. And then they announced that the contracts were cancelled. (These suppliers were further suported by a clause in the regulations which stated that any contractual arrangements violating the regulations is null and void.) The result was that the New York State Attorney General's office was forced to authorize districts to go into the open market and pay the resultant market price which often was the retail price. The same situation held true for gasoline. Most of those contracts negotiated in mid-season were either month-to-month or included escalator clauses. It was a case of charging what the market would bear.

Deregulation is not an answer. It has been estimated by a Library of Congress study that deregulation of natural gas prices would increase consumer costs by $5.4 billion annually in the first year and by $17.7 billion annually in the fifth to seventh year. Total de-control of oil prices would have an even greater effect on the schools than that which we described earlier. The aid provided in S. 701 would be simply an appetizer, if the energy companies felt they could compell total deregulation of supplies. As the AFL-CIO has pointed out, "There is no free market price for oil. It is an arbitrary price imposed by the OPEC cartel -- about $13 per barrel -- which bears no relation to the 18 cents a barrel production cost in the Arab countries. All other energy prices relate to the price of oil.

The argument that uncontrolled prices provide incentives for greater production is groundless. Domestic production of oil, despite skyrocketing prices for newly discovered oil, has been declining steadily. The same would be true for natural gas unless the producers, as initial government studies indicate, are sitting on their wells waiting for natural gas prices to be deregulated. If this is so, it constitutes the same kind of blackmail indulged in by the Arab oil producers.

We urge a complete and thorough investigation of the natural gas producers to determine whether the natural gas shortage is real or contrived by the producers to benefit themselves at the expense of the national interest."

Measures such as the one before the Committee are attempts to help make the best of an intolerable situation. We believe that in addition to attempting to help the schools past this crisis, a real attempt must be made to deal with the energy crisis in a comprehensive way. The schools have lost much already in the way of resources to the energy producers in what we believe to be a squeeze-play designed to use our public education system as well as other vital activities as a club in the energy producers' fight for deregulation. The oil prices in 1974 we have documented was the first major battle in this fight. What is needed in the long run are assurances by the federal government that energy prices will not be deregulated and if the pipeline and drilling companies do not wish to produce their product at the regulated prices, perhaps, a little competition through divestitures and greater government involvement could be a good solution.

Thank you for the opportunity to present our views. We will be happy to answer any questions you may have.

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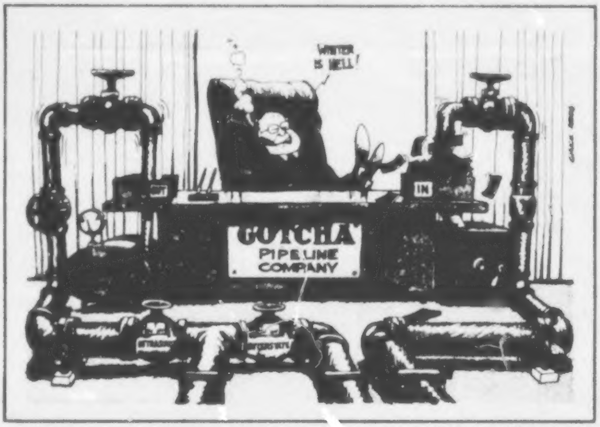
TESTIMONY
OF
DAL LAWRENCE, PRESIDENT
AFT # 250, AFL-CIO
TOLEDO, OHIO

BEFORE

THE UNITED STATES SENATE
EDUCATION SUB-COMMITTEE

MARCH 11, 1977


WINTER IS HELL!
IN
GOTCHA PIPELINE COMPANY

AYRES—Akron BEACON JOURNAL

INTRODUCTION

In December, 1975, the Toledo Federation of Teachers, American Federation of Teachers, AFL-CIO, conducted a survey of classroom environmental temperatures and found that about fifteen percent of the Toledo Public School students, or 9000, were in rooms with a thermostat temperature between 65 and 68 degrees. Nearly 1000 students were in rooms where the thermostat registered below 64 degrees. Considering the fact that seat temperatures fall 5 to 8 degrees below the thermostat temperature, we thought that students and teachers were being subjected to cruel environmental conditions forced upon us by the Columbia Gas Company. Little did we realize that this school year would be worse. It would be a disaster.

The Toledo school system has an enrollment of 54,000 students. Unlike most cities, enrollment has remained stable. Sixty-four of our seventy-five schools are fueled by natural gas. The system has severe financial problems, primarily due to Ohio's inept system of school finance. This past December the schools were closed thirteen days because insufficient funds existed to operate until December 31. Ohio law requires schools to complete each calendar year without an operating deficit. We reopened in January and were then closed again for two days because of heavy snow and seven days because of restrictive natural gas allocations by Columbia. It was not until the first week of March that students had an opportunity to attend school a full five day week.

Classroom temperatures were dropped to "maintenance levels" under threat of a complete shut off of gas. Damage to buildings was extensive. Students, already deprived of comfortable classrooms, found themselves without school altogether. When they returned temperatures were in the forty degree range. High schools operated on abbreviated schedules in areas heated electrically. Elementary schools moved to other buildings heated with alternate fuel. Attendance declined substantially, even when schools were open.

Toledo city schools were lucky. Most area schools closed for longer periods. But under great pressure from Columbia, this union, the school board and the superintendent resisted a general closing of four weeks that was being demanded by the company. Daily threats of a total shut off of gas continued until the school district purchased a gas well near Coshocton, Ohio, at $3.00 per thousand cubic feet.

Now area schools are purchasing natural gas from Toledo Public Schools. Toledo students are back in classes with thermostats set at 62 degrees. School will end on June 24. Ironically, many of these students will sit in classrooms where the temperature will hover between 95 and 100 degrees this spring. There is no hope of improvement. Next fall schools will again close early because money to operate through the calendar year is non-existent.

Alternate school calendars are under consideration to accommodate the gas company. Students will be left without summer jobs. Teachers will fair little better since most must work in the summer, or complete graduate work, in order to survive today's inflationary economy. The State of Ohio has no firm plan to come to the assistance of its hard pressed public schools. Continued hardship is forseen indefinitely into the future.

The Columbia Gas System has brought its share of misery and havoc to Toledo children and their parents. Throughout it all, the company has shown a callous disregard for the suffering inflicted. Its record as a public utility could hardly be worse, although one must remember that Toledoans felt that way about the company last year, and this year was worse.

Columbia sold gas outside Ohio this fall and in the fall of 1975. It boldly asked industry and school officials to write to you, the members of Congress, and demand that prices be deregulated. It threatened that already short allocations would get worse if prices were not deregulated, and it made good that threat.

The information and documents that follow show clearly that Columbia used the schools as leverage to force higher gas prices. The costs and energy saving techniques employed early by the school system are presented. The hardships of parents and students are detailed. And finally, the fact that the federal government's own Environmental Protection Agency mandated conversion from coal to alternative fuels by January 1, 1975, and stipulated that the school system would be fined if it did not comply, shows the almost total lack of sympathy, direction or consistency in federal energy policy.

This presentation is made today without much hope that anything will, or could, be done to correct the energy problems of our schools. For the most part it is too late. The Toledo system does not have money enough to escape the natural gas squeeze, or to pay for the damage already done. Most other Ohio schools are facing similar severe circumstances.

As suggested in the conclusion of this presentation, some federal action might help in the long range. In the short term, however, Toledo schools will lose a great number of its students in what has been otherwise a stable urban school enrollment. The combination of financial woes, precipitous integration orders by HEW and Columbia Gas System's almost total disregard for this fragile public institution are more a burden than our citizens reasonably can be expected to bear.

CURTAILMENT AND DEREGULATION

From 1971 through 1974 the Toledo Board of Education completed an extensive and costly conversion from coal fired boilers to gas fired boilers at the order of the Environmental Protection Agency. Columbia Gas of Ohio assured school officials that supplies would be adequate for the sixty-two schools involved. At the start of the 1973-74 school year, adequate gas was assumed. Schools were warm and a costly fine, threatened by EPA, had been avoided.

Just as the last schools were being converted, the system was notified by fuel oil distributors and Columbia Gas of Ohio that total supplies contracted for could not be delivered, or curtailments were necessary. Fuel oil prices had risen sharply. Ten schools were heated by this fuel, and on January 22, 1974, the Toledo Board of Education was informed that the first energy conservation measures had been taken. Room thermostats were set at 68 degrees. Hallways were maintained at 65 degrees. Heat was reduced further at 3:30 p.m. each day. The order affected all schools. Many of the buildings were old and complaints of discomfort came immediately from parents, students and teachers.

Columbia in a letter dated December 31, 1974, pointed out that the "continued worsening of the gas supply has made it necessary to impose severe limitations upon the supply of gas by all non-domestic customers." The letter concluded by asking cooperation "as well as your support for conservation, deregulation of the new suppliers of gas and other measures designed to alleviate such emergency."

Later correspondence would more pointedly ask school officials to write to Congress to demand deregulation of natural gas interstate prices.

Ohio's largest gas supplier is Columbia Gas Transmission System which supplies about 70% of Ohio's gas. Effective January 1, 1975, Columbia Transmission reduced supplies to its distributor companies such as Toledo's Columbia Gas of Ohio by 22%. It has been estimated that 50% of Ohio's 7000 industrial end users were affected. The first lay offs were recorded shortly thereafter. In Toledo, the first effects were felt by the glass industry.

Toledo schools were informed on January 21, 1975, that allocation of gas was to be cut to 60% of normal supply during the heating season, and 85% in the non-heating season. Beginning in April, 1975, a $10.00 per MCF penalty would be assessed for overruns. Columbia also warned that service could be terminated until curtailment levels were met.

The company had applied to the Ohio PUCO for permission to modify curtailment policies by extending them to commercial and small industrial customers, including schools. The penalty payment was submitted to the PUCO for approval. Columbia met with school officials locally and at the state level to explain its allocation system and gave energy saving suggestions.

All of this occurred at the time the president of the Columbia Gas System, B.J. Clarke, was telling Congressmen that "the gas supply will worsen until potential reserves which we are confident exist are developed. This will not occur until necessary incentives, such as the decontrol of new wellhead gas prices, are provided. ... your support in Congress to immediately declare a natural gas emergency, and pass legislation to decontrol the price of new gas at the wellhead," was requested of Ohio Congressman, Charles Mosher.

Clarke complained about low prices and suggested that many gas fields "are in advanced stages of depletion," a notion highly suspect in light of subsequent Congressional and FPC inquiries.

State and local school officials immediately began to devise ways to meet the new allocation cuts. Columbia did permit most school districts, including Toledo, to spread their allocations over all buildings. Toledo had twenty-five schools that were affected by the 40% cut back. By spreading the remaining allocation, it was possible to achieve a 20% to 25% district-wide allocation result.

While thermostats were ordered set at 68 degrees, seat temperatures ranged 5 to 8 degrees colder. Old schools were hard to maintain at any fixed degree. Many classrooms suffered through temperatures in the fifties. Buildings were not brought to temperature on Mondays until only an hour before classes were scheduled to begin. Heat was shut off at the close of school, and then one hour before the close of school. Most students wore tennis shoes and short sleeved T-shirts to school and shivered through the day. Conditions would get worse.

On February 10, 1975, the Ohio PUCO held its first hearing on the Columbia allocation plan and penalty rates. Our union intervened in the case. Nearly 400 school people were in attendance and the meeting site had to be changed. I testified personally - an unusual experience since I had not before attended a PUCO meeting. My testimony, while unpopular with gas company attorneys, was met with applause by the audience. The school board instructed its attorney to attend the hearing, but it was later discovered that he was the attorney for Columbia Gas of Ohio, also.

One farmer appeared and received more applause than I did. He had a gas well and he asked the hearing officer, in his best southern Ohio drawl, why he couldn't get Columbia to buy his gas. Between us we received the warm congratulations of the audience, but we got no gas. I had asked for schools to be placed in an allocation category with hospitals. That request was ignored, too. A little over a year later the PUCO made permanent an order approving the new restricted allocation system and penalty rates.

In frustration I later wrote to the three commissioners and invited them to hold a future hearing in one of our cold classrooms in Toledo. The chairman, C. Luther Heckman, wrote back a kind reply in which he assured me that he was getting a good idea about gas curtailments and the schools from his wife, who was a teacher. Considering "the constraints of my position," he said, "I will certainly do my best to eliminate ... undesirable effects of gas shortages on education in this state." The "constraints" turned out to be pretty severe as I look back on it, because the chairman and the governor resorted to a prayer meeting in the statehouse rotunda to ask for warmer weather this winter - their only noticeable move against Columbia Gas. The plea was dismissed out of hand.

In March, 1975, Columbia announced a series of rate "pass-through" increases, said curtailments would continue through the summer. On June 23, Columbia told the district that industries could face a 100% curtailment, and urged by letter that the school board and parents could correct the gas shortage by writing to Congress and ask for deregulation of new gas at the wellhead.

GETTING COLD

The 1975-76 school year in Toledo was marked by gas shortages and financial problems. Thermostats were cut back to 65 degrees and heat was provided only from 8:00 a.m. to 2:30 p.m. However, retail businesses operated normally, and many people began to question why children were freezing in school while shopping malls were warm.

Our union conducted a survey (under separate cover) of classrooms during December, 1976, and found environmental conditions in many classrooms to be far from the 72 degrees recommended by HEW as ideal for education. Some rooms were reported in the fifty degree range, and one school registered forty and fifty degree temperatures for a week. The outside temperatures for the period surveyed was relatively mild with some fifty degree days recorded.

What we were finding out was that large, old schools could not be heated evenly when thermostats were set back. Students wore gloves and boots in many rooms. Teachers complained loudly about the conditions and over this second winter of supply cutbacks, the morale of the staff began to slip badly. Students also began to get the notion that school must not be very important to adults if each day they were permitted to shiver their way through classes.

Aggravating the problem was the defeat of a school operating levy in November, 1975. The system cut back drastically on supplies and materials for classrooms, and economized in many other areas. Obviously the cost of fuel had increased as had all other supplies and normal operations were simply impossible.

Another school levy was defeated in June, 1976, and a third in November, 1976. Schools ran out of money and closed on December 3.

Ohio requires that each of its school districts submit to the voters requests for increased operating millage on property. Toledo schools had maintained most of their student population over the years. Peak enrollment was 64,000 and that figure stands at 54,000 today, most of the decline due to normal declining birth rates. Toledo is the only Ohio city with such a record.

But ample conditions existed to push the system into the same spiral of urban decay so prevalent in other areas. Parents were restive with cold schools. (Toledo had cut temperatures long before neighboring schools.) Students brought homework and tests home on back sides of discarded business order forms because adequate paper could not be purchased. HEW was demanding that staff integration be speeded up. (HEW officials have never spoken to teacher representatives.) Higher property taxes were being resisted by voters. And Ohio failed to fund its urban schools properly when it adopted an "equal yield" state aid formula, forcing even greater reliance on the property tax. Toledo schools have not had a property tax approval since 1968, and the prospects for approval in the future are virtually nil.

These factors were very much on the minds of parents and citizens as the 1976-77 school year commenced.

A Columbia Transmission spokesman said, "It's for whoever wants it." Columbia was offered 14 billion cubic feet of gas last fall, but failed to purchase the gas partly, if not wholly, to spite the state legislature which had refused to allow the additional cost of a 1975 emergency purchase to be spread to residential as well as industrial customers. Marvin White, Columbia Gas of Ohio board chairman, said, "Any way you look at it, if it were not for that piece of legislation, curtailment in Ohio would not be severe today." His remark was made on January 5, before most schools were forced to close.

White further stated that Columbia had tried to buy gas but needed a private company to sign a contract in advance to take the additional supply. But a member of Ohio's PUCO pointed out that some forty companies had signed up but were never supplied the gas. East Ohio Gas Company, which supplies most of the rest of the state's needs did not experience shortages.

Columbia Gas Transmission also sold considerable amounts of supply away from its Ohio distributors during October, 1976, thereby sealing the fate of schools and industries in the state.

For whatever reason, school systems and industries were notified that a crisis existed and beginning February 1, all industrial and commercial users using 1,000,000 cubic feet a month were to be cut to 85% of their supplies, which had already been curtailed previously. Those who had alternative capabilities already had been shut off completely. Statewide, some 1650 industrial and 13,300 commercial, including schools, were affected either by total shut offs or by severe curtailments.

In Toledo, eighteen schools were ordered cut back 85% from an already curtailed supply. Forty-six smaller schools were cut 30%. Interestingly, the schools were notified first among commercial classed users, mostly by telephone, that drastic curtailments would have to be effected immediately. While there is no documentary record, local gas company officials demanded that the school system close all its gas fired schools until the first week of March, a period of six weeks. The request was firmly refused. Most other Ohio districts experienced similar pressure. Many caved in and closed.

Columbia also went to the PUCO and requested that all unused allocations be returned to the system for general use. Such an order by the PUCO would have meant that past conservation efforts were in vain. Toledo's school effort had three years of conservation experience, even though most of it had been at the expense of the students. The order was not acted on after federal reallocation programs began to ease the situation.

On February 1, the northwest district manager for Columbia, John Pickens, sent a telegram to the Toledo school superintendent warning him that all gas would be shut off (after a 24 hour notice) unless the system closed. No mention was made of the fact that an appeal to the PUCO could delay such action. All large schools in the state were ordered to cut back to "maintenance levels" for at least a week. One Toledo high school was checked that weekend and found to be in the high forty temperature range, and school officials were told to drop the temperature further. By Friday, February 4, the schools had been closed seven days during January and February making a total of twenty days missed since December 3. It would be Wednesday of the following week, the 9th, before a normal schedule resumed.

Students had been deprived of a normal schedule on three additional days. Some students on these days were allowed to remain home, the rest subjected to 20 minute class periods huddled in 30 and 40 degree cold. All of Toledo's sixty-four gas fired buildings were affected - about 75% of the total enrollment.

Sports schedules were a mess. The girls varsity programs never did recover. Many students in inner-city schools just didn't come to school even on the days when they were open. Elementary classes of ten or fewer were not uncommon. High school and junior high pupils were tremendously affected. Attitudes toward school, not good to begin with, were bitter. By February 9, there had been only fifteen normal days of school since December 3, and those days had been spent freezing. Extra-curricular activities ground to a halt. Semester exams were cancelled. Many teachers had only one second quarter grade in their book on which to judge student progress. Most involved with schools simply gave up.

The state, faced with massive and extended closing, enacted a law to reduce the mandatory school year by fifteen days. These "energy days" simply would not be made up. Toledo would still hold sessions until June 24, however, to make up the thirteen days when operations ceased in December due to insufficient funds. The 160 day school year was due to expire with the termination date of the new law this summer, but in Ohio we feel very much pinched between shortened school years on one hand, and higher gas prices on the other.

COPING

There are over 4000 school buildings in Ohio. Seventy-three percent of them heat with natural gas. Only 8% have alternative fuel capabilities. Columbia supplies nearly half of the school districts, and 56 of Ohio's 88 counties.

Every school system supplied by Columbia has either closed its schools this winter for varying periods of time, shortened its school day or instituted split sessions with students in gas fired schools moved to buildings with alternative fuels. Industries and some schools had their supplies shut off entirely by the company. At one point the governor ordered the Dayton City Schools closed only to find out that he lacked such statutory authority.

Columbus City Schools closed for over three weeks. Students were brought in one day each week to receive homework assignments. Lesson plans were published in a Columbus newspaper. Students met in restaurants, banks, homes and one teacher I know met her students in the back room of a bar.

Beginning the day after Christmas, the temperature remained below freezing throughout the state until February 8. January's average temperature in Toledo was 9.7 degrees. Wind chill factors dropped regularly to -30 degrees and worse.

Columbia Gas of Ohio sold synthetic gas manufactured at Green Springs, Ohio to Washington D.C. throughout the heating season.

CONCLUSION AND SUGGESTIONS

Schools would have been closed even more than the twenty days already recorded had it not been for the purchase of a gas well announced February 8. A capped, but piped, well needed only a meter. The price was $3.00 per thousand cubic feet, up from the $1.90 price of regulated gas the schools were paying. Over five years the regular cost of gas had risen over 100%. Fuel oil was up 216%. Electricity 78%. The $3.00 price could not be afforded, but the choice was having school, or not having school. The public and news media supported the acquisition, although neither had given much support to raising new revenues.

Vaught Oil, the owner of the well, under pressure from the Federal Power Commission, then reduced the price to $2.50, supposedly because the Toledo system had agreed to sell its surplus to neighboring schools. The total purchase amounted to 45 million cubic feet with 25.8 million slated for area schools. Even so, one Toledo area district did not reopen its schools until February 28.

Damage to schools was extensive. Over $50,000 in damage was recorded in Toledo schools alone. More will become evident as warm weather occurs and roof leaks appear.

The final irony is that taking children out of buildings eliminated body heat, and it is estimated that fuel savings were minimal as a result. Further, it should be remembered that pupils at home open doors and cause substantial heat loss. And just across the state line in Michigan students were in school and warm.

Columbia had at best been guilty of incredibly bad management, but most felt the Columbia Gas System, and especially its Ohio distributors, made an all out effort to force price deregulation, and was determined to prove to the legislature that its prohibition of pass-through costs for emergency supplies was unwarranted. Although Columbia probably would deny it, schools were major targets in an effort to impress upon people that gas was in short supply, and that the problem could not be corrected without deregulation. An extensive advertising campaign has been waged in the state over the past three years (since oil producers succeeded in driving the price of motor fuel and oil up) to gain public support for deregulation. The cost of the ads is then charged back to the consumer, courtesy of the legislature and the PUCO.

Curtailments appear to be a permanent feature of school life. Cold classrooms will continue, if for no other reason than the Toledo schools do not have the estimated $7,500,000 necessary to convert to coal, even if the EPA would permit it. The costs of fuel are already beyond what the district can afford, especially when one considers that the schools will have to close some time in November this year when available funds are again depleted. The forty-ninth largest public school district in the nation has been brought to its knees.

Toledo area superintendents are attempting to start school on August 15, and break for over a month in December and January in order to find ways to afford fuel and escape the clutches of Columbia. Buildings are not equipped for hot weather. There is just no end in sight to student discomfort.

In conclusion, there are some things that Congress might do to give some long range assistance to schools afflicted by the energy crisis.

- * Maintain strict price controls on new gas. If "winter is hell," as the cartoon from the Akron Beacon Journal suggests, then most of us in the schools are prepared to fight it out on this line, indefinitely.

- * Fund research for cleaning sulfur dioxide emissions from high sulfur content coal that Ohio possesses in abundance.

- * Order an exemption to EPA emission standards for high sulfur coal for schools. Place production and pricing of coal under a federal regulation agency with teeth.

- Establish a national gas allocation system that requires interstate gas to be distributed to schools and hospitals in "human needs" categories, with fixed, economical rates.

- Fund conversion of gas fired boilers in schools to alternative fuels.

- Establish a separate cabinet level department of energy.

- Impose an excess profits tax on companies that profited from the shortages. In Ohio, Columbia obviously diverted much fuel from lower rated commercial and industrial end users to higher rated residential users.

A SURVEY OF TEMPERATURES
IN CLASSROOMS
TOLEDO PUBLIC SCHOOLS
DECEMBER, 1975

Conducted by:
Toledo Federation of Teachers,
AFT, AFL-CIO, and
its members

INTRODUCTION

The teachers' union conducted a temperature survey on four days in December in an effort to bring about public awareness of unusually cold classrooms in almost all Toledo Public Schools. The four days selected in advance turned out to be relatively mild winter days. One Sunday a record was set, in fact, for the highest recorded temperature on that date—65°. Despite these higher than normal readings, classrooms were too cold for an effective educational environment. Who is to blame?

Columbia Gas of Ohio and its owners, public officials and Toledo school officials all must bear a heavy responsibility for the abuse school children are subjected to now on a daily basis. Columbia has waged a massive advertising campaign to convince the public that it cannot obtain adequate gas supplies for large industrial users. At the same time the utility has written letters to and held private meetings with businessmen and legislators to convince them that the key to more natural gas is deregulation by Congress of the price of gas at the wellhead. Theoretically, as gas increases in price, greater exploration for gas will ensue.

The industry plea has been to equalize profit margins on natural gas with oil and gasoline. Considerable evidence exists to document a case that natural gas has been arbitrarily withheld from the market to drive the price upward. This evidence has been presented to both the Federal Power Commission and the Ohio Public Utilities Commission. While neither agency has responded with forceful action against the utilities and their owners, neither have they given blanket approval to utility sought rate increases or curtailment programs. This is in large part due to considerable public outrage.

In Ohio, the PUCO has given approval to a utility sponsored curtailment program that essentially treats all large users of natural gas alike. Whether the end users are public or private, all have been cut back 30 to 50 percent in allocations, with stiff penalty rates applied for usage over allocation. Schools and hospitals were not exempted in the Columbia proposal to the PUCO, and neither PUCO nor the Ohio legislature have acted to exempt these institutions.

The result is that now we have school children used as pawns in a gigantic effort to pressure the public to ask for price deregulation. Increduously, at the same time stores are open for business at normal and, we think, excessive hours, school children are shivering in ice-cold desks attempting to concentrate on their lessons. If there is a lesson to be learned in all this it is that our legislative bodies and regulatory agencies are nearly impervious to public demand when the public's opinion conflicts with big company and utility profits.

In fact, newspapers and television stations locally have not shown much editorial interest in the problem beyond occasionally calling for the deregulation of natural gas. Not a single editorial has drawn attention to the youngsters and their parents who are the helpless victims. News coverage, while extensive, generally has either ignored the problems of gas users or down played their effects. A classic example of this occurred on December 12. In response to notice that this union would be conducting temperature surveys in various school rooms, The Toledo Blade carried a prominently displayed news article headlined, "Fuel-Conservation Measures In Public Schools Are Relaxed." Toledo school administrators admitted they were revising their heating policies to "remedy the situation with which the teachers' union is concerned."

Almost the entire article was devoted to comments about how little inconvenience was noticed, how few complaints administrators had from parents and how much fun it was to sit in a cold room. "There are almost no complaints from students, many of whom appear to enjoy wearing coats in class even on warmer days," an administrative official was quoted as saying.

But during the week of January 5, temperatures dropped to near zero with highs seldom above 20° and students threatened walkouts, typewriters froze up, some schools opened their doors for children to sit in 30° temperatures and several were not heated above 45° at 10:30 in the morning! There was no news coverage that week. Contrasted to this were the featured stories about cold classrooms several years ago as a result of a work slowdown by boiler operators in the midst of contract negotiations.

Despite the fact that only gas is in short supply almost all schools are affected by an administrative order to curtail heating hours regardless of their energy supply. Certainly, reasonable, adequate heat for as many students as possible ought to be a priority item in school decision making. Obviously, it is not, and not all the blame for the discomfort of school children can be blamed on Columbia Gas and the PUCO, although there is ample blame for all.

We would suggest and urge all elected officials to reexamine those policies which have led to the present situation. Tougher regulatory powers for the FPC and the PUCO are needed. It is necessary that the companies which control the drilling and transportation of natural gas be subject to greater control by regulatory bodies. Their financial dealings and ownership should be made a matter of public record since the public grants them monopoly rights. Rather than less price regulation, greater control of prices and supplies should be set through a system of price ceilings and supply quotas which would guarantee the public a fair price and supply of natural gas rather than leaving supplies to the whims of the companies.

Last, the legislature should take immediate steps to make it mandatory in the State of Ohio for a utility to supply regularly needed amounts of energy to schools and hospitals.

In the charts that follow it is important to keep in mind that the temperatures represent thermostat degrees averaged throughout a school from numerous rooms reporting in the building. The environmental temperature, or seat temperature of the student, was not recorded. However, it is estimated that the environmental temperature is 5 to 8 degrees colder than the temperature at the thermostat.

The low and high figures represent the coldest and warmest rooms recorded at a particular school on the date indicated.

THE BLADE: TOLEDO, OHIO, MONDAY, DECEMBER 8, 1975

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Data From NATIONAL WEATHER SERVICE, NOAA, U.S. Dept. of Commerce
FORECAST
Figures Show Low Temperatures Expected Until Tuesday Morning
Isolated Precipitation Not Indicated — Consult Local Forecast
COLD
WARM
STATIONARY
Rain
Showers
Snow
Flurries

HOW TO READ MAP: Figures and narrow solid lines show expected temperatures. "High" and "low" refer to anticipated Barometric pressure, with arrows indicating wind directions. Precipitation is forecast in shaded areas.

CONDITIONS

A low pressure front moving northeast along the east coast from eastern Georgia, will spread precipitation in the form on snow over northwest Ohio tonight and Tuesday. Fair weather should return Wednesday. (Report by National Weather Service.)

Toledo Readings

	Airport	Blade Bldg		Airport	Blade Bldg
1 p.m.	34	31	1 a.m.	30	31
2 p.m.	35	33	2 a.m.	30	30
3 p.m.	34	35	3 a.m.	29	30
4 p.m.	33	34	4 a.m.	29	29
5 p.m.	32	[illegible]	5 a.m.	29	29
6 p.m.	30	33	6 a.m.	30	32
7 p.m.	28	32	7 a.m.	29	32
8 p.m.	[illegible]	29	8 a.m.	29	30
9 p.m.	31	32	9 a.m.	30	30
10 p.m.	31	29	10 a.m.	32	30
11 p.m.	31	32	11 a.m.	33	30
12 mid.	31	31	12 noon	33	37

Temperature Data

	Blade Bldg	Airport
Low Overnight	29	27
High Sunday	35	35
Low Sunday	29	21
Mean Sunday	32	28
Normal on Dec. 7		28
Departure from normal		—?
High Dec. 8 last year		36
Low Dec. 8 last year		23
Mean Dec. 8 last year		30
High this date 61 in 1966		
Low this date 7 in 1882		

Monday
12-8

Sunday low 29°

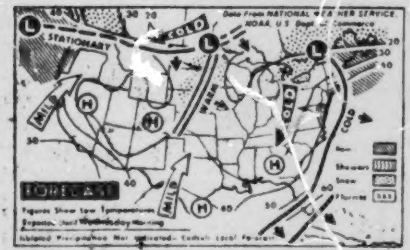
CLASSROOM TEMPERATURE SURVEY
DECEMBER 8, 1975
TOLEDO PUBLIC SCHOOLS

SCHOOL	FUEL	AVG. A.M. TEMP.	AVG. P.M. TEMP.	LO	HI
WHITTIER	GAS	67	70	61	70
MACOMBER	GAS	74	75	72	76
EDGEWATER	GAS	69	69	66	70
PT. PLACE	GAS	69	68	64	73
GLENWOOD	GAS	69	69	68	80
E.S. CENTRAL	GAS	68	67	64	72
DEVEAUX	GAS	67	68	62	70
NAVARRE	GAS	68	67	55	71
OLD ORCHARD	GAS	65	61	58	70
JEFFERSON CEN.	GAS	68	68	68	68
FRANKLIN	GAS	69	70	65	70
N. HALE	GAS	69	69	60	78
WHITNEY	GAS	67	67	62	70
GUNCKEL	GAS	69	71	56	78
REYNOLDS	OIL	68	68	66	70
MT. VERNON	GAS	65	68	62	68
GLANN	GAS	69	69	64	76
KLEIS	GAS	67	70	62	74
RYDER	GAS	67	67	64	68
DEVILBISS	GAS	61	67	54	72
CHERRY	GAS	70	71	59	78
WOODWARD	OIL	67	NOT RECORDED	58	79
MARTIN	GAS	68	68	67	70
MCTIGUE	GAS	66	64	60	70
CHASE	ELECTRIC	70	70	68	74
HEATHERDOWNS	OIL	67	68	64	70

CLASSROOM TEMPERATURE SURVEY
DECEMBER 8, 1975
CONT.

SCHOOL	FUEL	AVG. A.M. TEMP.	AVG. P.M. TEMP.	LO	HI
LIBBEY	GAS	62	68	50	73
HAMILTON	GAS	65	70	60	72
BOWSHER	GAS	69	69	66	74
RAYMER	GAS	68	65	60	70
ALRC	OIL	71	69	69	72
ARLINGTON	GAS	68	70	59	72
GARFIELD	GAS	68	68	62	70
OTTAWA RIVER	GAS	69	66	62	72
RIVERSIDE	GAS	68	69	64	70
BEVERLY	OIL	68	68	64	72
WESTFIELD	GAS	69	70	64	74
MARSHALL	GAS	69	70	66	72
HARVARD	GAS	68	70	52	75
WARREN	OIL	73	73	67	78
CRITTENTON	GAS	72	73	63	79
OAKDALE	GAS	67	68	63	70
LONGFELLOW	GAS	68	71	65	76

THE BLADE: TOLEDO, OHIO, TUESDAY, DECEMBER 9, 1975


Data From NATIONAL WEATHER SERVICE
NOAA, U.S. Dept. of Commerce
L
STATIONARY
COLD
WARM
COLD
COLD
MILD
MILD
H
20
30
40
30
40
60
50
60
FORECAST
Figures Show Low Temperatures Expected Until Wednesday Morning
Isolated Precipitation Not Indicated—Consult Local Forecast
Rain
Showers
Snow
Flurries

HOW TO READ MAP: Figures and narrow solid lines show expected temperatures. "High" and "Low" refer to anticipated barometric pressure, with arrows indicating wind directions. Precipitation is forecast in shaded areas.

CONDITIONS

A colder and drier air mass will spread over northwest Ohio tonight in the wake of a low pressure system, which moved east through the Ohio valley during the day Tuesday. A few snow flurries will remain, especially near the lake. Decreasing cloudiness tonight and Wednesday.

Toledo Readings

(Readings from 1 p.m. Tuesday)

	Airport	Blade Bldg		Airport	Blade Bldg
1 p.m.	34	34	1 a.m.	32	32
2 p.m.	35	36	2 a.m.	32	33
3 p.m.	34	36	3 a.m.	32	32
4 p.m.	35	35	4 a.m.	32	31
5 p.m.	[illegible]	[illegible]	5 a.m.	31	30
6 p.m.	35	[illegible]	6 a.m.	[illegible]	31
7 p.m.	[illegible]	[illegible]	7 a.m.	30	30
8 p.m.	34	34	8 a.m.	29	30
9 p.m.	[illegible]	33	9 a.m.	29	32
10 p.m.	[illegible]	[illegible]	10 a.m.	29	[illegible]
11 p.m.	[illegible]	[illegible]	11 a.m.	30	[illegible]
12 mid	[illegible]	[illegible]	12 noon	31	[illegible]

Temperature Data

	Blade Bldg	Airport
Low Overnight	30	30
High Tuesday	35	35
Low Tuesday	30	29
Mean Tuesday	33	32
Normal on Dec. 8		30
Departure from normal		2
High Dec. 9 last year		27
Low Dec. 9 last year		18
Mean Dec. 9 last year		23
High this date 60 in 1932		
Low this date −5 in 1917		

Monday 12-8

Tuesday 12-9

Monday low 30°

CLASSROOM TEMPERATURE SURVEY
DECEMBER 9, 1975
TOLEDO PUBLIC SCHOOLS

SCHOOL	FUEL	AVG. A.M. TEMP.	AVG. P.M. TEMP.	LO	HI
WHITTIER	GAS	67	68	61	70
MACOMBER	GAS	78	NOT RECORDED	76	80
EDGEWATER	GAS	69	68	68	70
PT. PLACE	GAS	69	70	67	74
GLENWOOD	GAS	69	68	64	78
E.S. CENTRAL	GAS	68	68	65	72
DEVEAUX	GAS	66	67	62	68
NAVARRE	GAS	68	67	55	71
OLD ORCHARD	GAS	67	67	60	73
JEFFERSON CEN.	GAS	68	68	68	68
FRANKLIN	GAS	69	70	64	72
N. HALE	GAS	68	69	64	70
GUNCKEL	GAS	69	72	55	78
REYNOLDS	OIL	67	68	67	69
MT. VERNON	GAS	67	69	64	70
GLANN	GAS	67	69	65	72
KLEIS	GAS	66	69	62	74
RYDER	GAS	66	67	62	68
DEVILBISS	GAS	65	71	62	84
CHERRY	GAS	70	72	62	76
WOODWARD	OIL	50	67	48	70
MARTIN	GAS	69	71	65	82
MCTIGUE	GAS	63	68	58	71
CHASE	ELECTRIC	70	70	68	74
HEATHERDOWNS	OIL	68	69	64	70
HAMILTON	GAS	61	70	57	72
BOWSHER	GAS	68	69	66	72

CLASSROOM TEMPERATURE SURVEY
DECEMBER 9, 1975
CONT.

SCHOOL	FUEL	AVG. A.M. TEMP.	AVG. P.M. TEMP.	LO	HI
ALRS	GAS	70	70	69	72
GARFIELD	GAS	68	69	64	72
OTTAWA RIVER	GAS	68	67	63	72
BEVERLY	OIL	65	68	58	72
WESTFIELD	GAS	70	67	67	70
MARSHALL	GAS	69	70	66	72
HARVARD	GAS	67	71	62	73
WARREN	OIL	73	74	68	78
OAKDALE	GAS	68	68	62	72
RAYMER	GAS	69	65	60	70

THE BLADE: TOLEDO, OHIO, WEDNESDAY, DECEMBER 10, 1975

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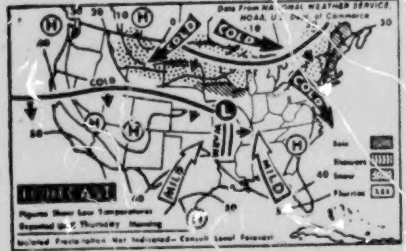
Data From NATIONAL WEATHER SERVICE, NOAA, U.S. Dept. of Commerce
COLD
COLD
COLD
COLD
MILD
MILD
H
L
30
40
10
Rain
Showers
Snow
Flurries
FORECAST
Figures Show Low Temperatures Expected Until Thursday Morning
Isolated Precipitation Not Indicated—Consult Local Forecast

HOW TO READ MAP: Figures and narrow solid lines show expected temperatures. "High" and "low" refer to anticipated barometric pressure, with arrows indicating wind directions. Precipitation is forecast in shaded areas.

CONDITIONS

A weak ridge of high pressure, moving through the lower Great Lakes, will bring mostly fair weather, but cold temperatures for tonight. There will be slight warming of temperatures by Thursday. (Report by National Weather Service.)

Toledo Readings

(Readings from 1 p.m. Tuesday)

	Airport	Blade Bldg.		Airport	Blade Bldg.
1 p.m.	34	33	1 a.m.	32	28
2 p.m.	35	34	2 a.m.	27	28
3 p.m.	34	33	3 a.m.	25	27
4 p.m.	35	33	4 a.m.	26	27
5 p.m.	34	32	5 a.m.	23	27
6 p.m.	35	32	6 a.m.	22	25
7 p.m.	34	32	7 a.m.	21	26
8 p.m.	34	31	8 a.m.	24	31
9 p.m.	34	30	9 a.m.	26	32
10 p.m.	33	29	10 a.m.	27	34
11 p.m.	32	29	11 a.m.	29	34
12 mid.	32	29	12 noon	30	35

Temperature Data

	Blade Bldg.	Airport
Low Overnight	27	20
High Tuesday	36	33
Low Tuesday	24	29
Mean Tuesday	29	31
Normal on Dec. 9		30
Departure from normal		[illegible]
High Dec. 10 last year		[illegible]
Low Dec. 10 last year		[illegible]
Mean Dec. 10 last year		[illegible]

High this date 67 in 1971.
Low this date —6 in 1958.

Tuesday
12-9

Tuesday low 27°

HE BLA

One Of America's Great Newspapers

TOLEDO, OHIO, MONDAY, DECEMBER 15, 1975

Record Falls As Mercury Rises To 65, Stirs Thoughts Of May In Toledoans

Reading At Airport Sets High For 2nd Consecutive Day

A balmy high of 65 degrees Sunday shattered, by 7 degrees, an 84-year-old temperature record and enticed Toledo area residents to such unseasonal activities as washing the car and a shirtsleeve walk in the park.

But by tonight, the May-like weather will seem to have been an illusion, according to the National Weather Service. Temperatures tonight are expected to fall into the low 20s.

Sunday's reading at Toledo Express Airport was the second consecutive day for a record high. Saturday's high of 62 was 2 degrees over the record for a Dec. 13 set in 1927.

The previous record for a Dec. 14 was 58 degrees in 1891. The high Sunday at The Blade's weather station downtown also was 65 degrees.

The Toledo Zoo had an estimated 5,000 visitors Sunday, far above the normal for mid-December, zoo officials said. About 3,[illegible]00 persons attended the Christmas Around the World display at the zoo.

Metropark officials said attendance Sunday was slightly above normal, but an even larger increase was noted in motor traffic in the park. Wet grounds may have kept people from getting out of their cars, but they still came to the parks, a spokesman said.

THE BLADE: TOLEDO, OHIO, MONDAY, DECEMBER 15, 1975

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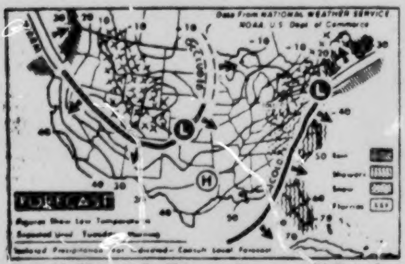
Data From NATIONAL WEATHER SERVICE
NOAA, U.S. Dept. of Commerce
FORECAST
Figures Show Low Temperatures Expected Until Tuesday Morning
Isolated Precipitation Not Indicated—Consult Local Forecast
Rain
Showers
Snow
Flurries
COLD
L
L
H
30
20
10
-10
40
50
60
70

HOW TO READ MAP: Figures and narrow solid lines show expected temperatures. "High" and "low" refer to anticipated barometric pressure, with arrows indicating wind directions. Precipitation is forecast in shaded areas.

CONDITIONS

Colder tonight, with snow flurries as northwest flow of air brings winter-like weather to northwest Ohio. Continued cold Tuesday. (Report by National Weather Service.)

Toledo Readings

(Readings from 1 p.m. Sunday)

	Airport	Blade Bldg		Airport	Blade Bldg
1 p.m.	64	64	1 a.m.	56	56
2 p.m.	65	65	2 a.m.	55	55
3 p.m.	65	65	3 a.m.	54	53
4 p.m.	65	64	4 a.m.	53	52
5 p.m.	63	63	5 a.m.	50	51
6 p.m.	62	61	6 a.m.	50	51
7 p.m.	62	61	7 a.m.	50	50
8 p.m.	61	61	8 a.m.	48	50
9 p.m.	62	61	9 a.m.	48	50
10 p.m.	61	61	10 a.m.	46	51
11 p.m.	59	60	11 a.m.	44	48
12 mid.	59	62	12 noon	42	46

Temperature Data

	Blade Bldg.	Airport
Low Overnight	50	50
High Sunday	65	65
Low Sunday	50	50
Mean Sunday	58	58
Normal on Dec. 14		28
Departure from normal		30
High Dec. 15 last year		37
Low Dec. 15 last year		32
Mean Dec. 15 last year		35

High this date 65 in 1933.
Low this date —5 in 1914.

Sunday low
50°

Monday
12-15

CLASSROOM TEMPERATURE SURVEY
DECEMBER 15, 1975
TOLEDO PUBLIC SCHOOLS

SCHOOL	FUEL	AVG. A.M. TEMP.	AVG. P.M. TEMP.	LO	HI
EDGEWATER	GAS	68	68	64	70
PT. PLACE	GAS	68	69	62	75
E. S. CENTRAL	GAS	68	68	68	68
NAVARRE	GAS	68	68	66	72
OLD ORCHARD	GAS	59	65	49	68
JEFFERSON CEN.	GAS	68	68	68	68
GUNCKEL	GAS	69	70	62	78
REYNOLDS	OIL	67	68	66	69
MT. VERNON	GAS	67	68	67	68
KLEIS	GAS	67	NOT RECORDED	62	72
DEVILBISS	GAS	68	72	68	72
CHERRY	GAS	72	72	62	76
MARTIN	GAS	70	71	66	80
MCTIGUE	GAS	66	68	60	74
CHASE	ELECTRIC	70	70	67	72
HEATHERDOWNS	OIL	70	69	68	72
BOWSHER	GAS	70	70	66	74
RAYMER	GAS	71	67	66	75
S. SHARPLES	OIL	46	65	14	75
ALRC	GAS	68	67	65	72
HARVARD	GAS	68	70	64	73
OAKDALE	GAS	67	68	64	72

THE BLADE: TOLEDO, OHIO, TUESDAY, DECEMBER 16, 1975

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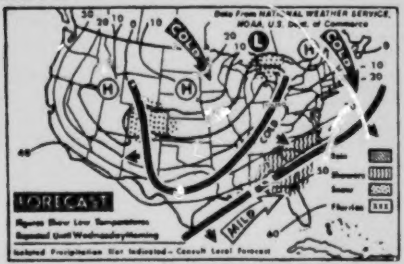

Data From NATIONAL WEATHER SERVICE, NOAA, U.S. Dept. of Commerce
30
20
10
0
10
COLD
20
10
L
H
H
H
COLD
0
-10
-20
COLD
40
30
MILD
40
FORECAST
Figures Show Low Temperatures Expected Until Wednesday Morning
Rain
Showers
Snow
Flurries
Isolated Precipitation Not Indicated—Consult Local Forecast

HOW TO READ MAP: Figures and narrow solid lines show expected temperatures. "High" and "low" refer to anticipated barometric pressure, with arrows indicating wind directions. Precipitation is forecast in shaded areas.

CONDITIONS

Light snow or flurries are expected tonight and early Wednesday as another cold front passes through northwest Ohio. (Report by National Weather Service.)

Toledo Readings

(Readings from 1 p.m. Monday)

	Air-port	Blade Bldg.		Air-port	Blade Bldg.
1 p.m.	[illegible]	[illegible]	1 a.m.	[illegible]	[illegible]
2 p.m.	[illegible]	[illegible]	2 a.m.	[illegible]	[illegible]
3 p.m.	[illegible]	[illegible]	3 a.m.	[illegible]	[illegible]
4 p.m.	[illegible]	[illegible]	4 a.m.	[illegible]	[illegible]
5 p.m.	[illegible]	[illegible]	5 a.m.	[illegible]	[illegible]
6 p.m.	[illegible]	[illegible]	6 a.m.	[illegible]	[illegible]
7 p.m.	[illegible]	[illegible]	7 a.m.	[illegible]	[illegible]
8 p.m.	[illegible]	[illegible]	8 a.m.	[illegible]	[illegible]
9 p.m.	[illegible]	[illegible]	9 a.m.	[illegible]	[illegible]
10 p.m.	[illegible]	[illegible]	10 a.m.	[illegible]	[illegible]
11 p.m.	[illegible]	[illegible]	11 a.m.	[illegible]	[illegible]
12 mid.	[illegible]	[illegible]	12 noon	[illegible]	[illegible]

Temperature Data

	Blade Bldg.	Air-port
Low Overnight	[illegible]	[illegible]
High Monday	[illegible]	[illegible]
Low Monday	[illegible]	[illegible]
Mean Monday	[illegible]	[illegible]
Normal on Dec. 15		[illegible]
Departure from normal		+[illegible]
High Dec. 16 last year		[illegible]
Low Dec. 16 last year		[illegible]
Mean Dec. 16 last year		[illegible]
High this date 55 in 1948		
Low this date -10 in 1951		

Monday
12-15

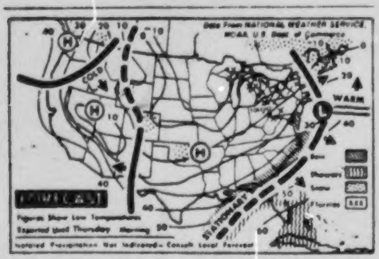
Tuesday
12-16

Monday low
30°

CLASSROOM TEMPERATURE SURVEY
DECEMBER 16, 1975
TOLEDO PUBLIC SCHOOLS

SCHOOL	FUEL	AVG. A.M. TEMP.	AVG. P.M. TEMP.	LO	HI
PT. PLACE	GAS	67	70	60	75
E.S. CENTRAL	GAS	68	68	68	68
OLD ORCHARD	GAS	56	65	52	65
JEFF. CEN.	GAS	68	68	68	68
GUNCKEL	GAS	68	70	52	78
REYNOLDS	OIL	67	67	60	70
MT. VERNON	GAS	68	68	68	68
KLEIS	GAS	69	70	65	72
CHERRY	GAS	70	71	58	78
MARTIN	GAS	68	69	67	71
MCTIGUE	GAS	65	68	63	68
CHASE	ELECTRIC	70	70	67	72
BOWSHER	GAS	70	70	64	74
RAYMER	GAS	68	68	62	72
ALRC	GAS	68	66	63	71
LAGRANGE	COAL	68	69	58	75
HARVARD	GAS	65	69	62	71
OAKDALE	GAS	68	68	64	70

THE BLADE: TOLEDO, OHIO, WEDNESDAY, DECEMBER 17, 1975


Data From NATIONAL WEATHER SERVICE, NOAA, U.S. Dept. of Commerce
COLD
WARM
STATIONARY
H
L
Rain
Showers
Snow
Flurries
FORECAST
Figures Show Low Temperatures Expected Until Thursday Morning
Isolated Precipitation Not Indicated—Consult Local Forecast

HOW TO READ MAP: Figures and narrow solid lines show expected temperatures. "High" and "low" refer to anticipated barometric pressure, with arrows indicating wind directions. Precipitation is forecast in shaded areas.

CONDITIONS

Fair and very cold tonight and Thursday, as Canadian air spreads across northwest Ohio. Low tonight 8 to 16 above. High Thursday in the low to mid 20s. (Report by National Weather Service.)

Toledo Readings

(Readings from 1 p.m. Tuesday)

	Air-port	Blade Bldg.		Air-port	Blade Bldg.
1 p.m.	34	34	1 a.m.	29	30
2 p.m.	33	33	2 a.m.	28	29
3 p.m.	31	32	3 a.m.	29	30
4 p.m.	31	31	4 a.m.	29	29
5 p.m.	30	31	5 a.m.	29	29
6 p.m.	29	29	6 a.m.	29	29
7 p.m.	29	30	7 a.m.	28	29
8 p.m.	30	29	8 a.m.	27	32
9 p.m.	29	29	9 a.m.	27	32
10 p.m.	29	29	10 a.m.	27	32
11 p.m.	29	29	11 a.m.	28	31
12 mid.	29	30	12 noon	34	31

Temperature Data

	Blade Bldg.	Air-port
Low overnight	28	27
High Tuesday	34	34
Low Tuesday	28	29
Mean Tuesday	31	32
Normal on Dec. 16		30
Departure from normal		+2
High Dec. 17 last year		34
Low Dec. 17 last year		25
Mean Dec. 17 last year		30

High this date 58 in 1877.
Low this date —8 in 1951.

Tuesday
12-16

Wednesday
12-17

Tuesday low
28°

CLASSROOM TEMPERATURE SURVEY
DECEMBER 17, 1975
TOLEDO PUBLIC SCHOOLS

SCHOOL	FUEL	AVG. A.M. TEMP.	AVG. P.M. TEMP.	LO	HI
WHITTIER	GAS	66	66	58	70
ROGERS	COAL	70	69	62	80
GLENWOOD	GAS	67	69	66	72
NAVARRE	GAS	68	68	65	72
FRANKLIN	GAS	69	69	68	72
N. HALE	GAS	72	71	68	77
GLANN	GAS	59	68	59	72
RYDER	GAS	66	68	62	69
HAMILTON	GAS	63	68	60	70
ARLINGTON	GAS	68	71	63	75
OTTAWA RIVER	GAS	69	66	62	72
RIVERSIDE	GAS	67	69	62	74
BEVERLY	OIL	59	66	52	70
WESTFIELD	GAS	70	69	68	72
MARSHALL	GAS	69	70	68	72
WARREN	OIL	74	75	72	80
CRITTENTON	GAS	72	74	68	77

THE BLADE: TOLEDO, OHIO, THURSDAY, DECEMBER 18, 1975

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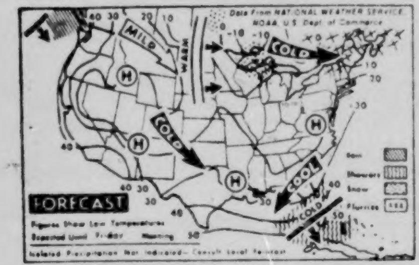
Data From NATIONAL WEATHER SERVICE
NOAA, U.S. Dept. of Commerce
MILD
WARM
COLD
COLD
COOL
COLD
H
40 30 20 10 0 -10 -10 0 10 20 30 40 30 30 40 30 40 30 50
Rain
Showers
Snow
Flurries
FORECAST
Figures Show Low Temperatures
Expected Until Friday Morning
Isolated Precipitation Not Indicated—Consult Local Forecast

HOW TO READ MAP: Figures and narrow solid lines show expected temperatures. "High" and "low" refer to anticipated barometric pressure, with arrows indicating wind directions. Precipitation is forecast in shaded areas.

CONDITIONS

A high pressure system over the plains states will move slowly eastward, causing generally fair skies and colder temperatures through Friday. Slightly warmer Saturday. (Report by National Weather Service.)

Toledo Readings

(Readings from 1 p.m. Wednesday)

	Air-port	Blade Bldg.		Air-port	Blade Bldg.
1 p.m.	23	23	1 a.m.	14	14
2 p.m.	23	22	2 a.m.	13	14
3 p.m.	22	22	3 a.m.	13	14
4 p.m.	21	21	4 a.m.	13	14
5 p.m.	20	20	5 a.m.	16	15
6 p.m.	19	19	6 a.m.	14	14
7 p.m.	18	18	7 a.m.	14	13
8 p.m.	17	17	8 a.m.	13	13
9 p.m.	16	16	9 a.m.	14	19
10 p.m.	15	14	10 a.m.	15	20
11 p.m.	14	14	11 a.m.	15	20
12 mid	14	14	12 noon	15	20

Temperature Data

	Blade Bldg.	Airport
Low Overnight	13	13
High Wednesday	24	29
Low Wednesday	13	14
Mean Wednesday	19	22
Normal on Dec. 17		27
Departure from normal		−5
High Dec. 18 last year		30
Low Dec. 18 last year		24
Mean Dec. 18 last year		27

High this date, 58 in 1939.
Low this date, 7 below in 1945.

Wednesday
12-17

Thursday
12-18.

Wednesday low
13°

CLASSROOM TEMPERATURE SURVEY
DECEMBER 18, 1975
TOLEDO PUBLIC SCHOOLS

SCHOOL	FUEL	AVG. A.M. TEMP.	AVG. P.M. TEMP.	LO	HI
WHITTIER	GAS	66	66	55	70
MACOMBER	GAS	71	71	60	80
FRANKLIN	GAS	68	68	68	68
N. HALE	GAS	71	69	68	74
GLANN	GAS	67	68	64	70
RYDER	GAS	63	64	60	67
HEATHERDOWNS	OIL	67	68	58	71
ARLINGTON	GAS	67	69	64	70
OTTAWA RIVER	GAS	67	64	60	70
RIVERSIDE	GAS	66	68	60	73
BEVERLY	OIL	60	66	50	70
WESTFIELD	GAS	71	69	68	74
MARSHALL	GAS	66	70	66	70
WARREN	OIL	72	74	58	78
CRITTENTON	GAS	71	71	65	77

Crossgates School
3900 Shadylawn Dr.
Toledo, O. 43614
Jan. 11, 1976

Toledo Federation of Teachers

Re: Temperatures at Crossgates- week of Jan. 5

Del Lawrence;

The last three days of the week of Jan. 5 it was so cold when the teachers arrived and would turn the lights on in the classrooms they would not work properly, because the activators on the lights wouldn't come on. We were told to keep the drapes drapes drawn, so this resulted in some dimly lit classrooms.

The following is a list of temperatures taken from a room in each of the three wings of the building:

Room 8

Wed.	Thur.	Fri.
8:45 56°	8:45 52	8:30 44
10:00 63°	10:10 64	9;15 49
11:45 66°	11:40 65	10:45 55
1:15 67°	2:00 67	11:30 59

Location: Reading chair in center of the room.

10:00 62	8:45 52	8:30 45
11:45 66	10:10 65	9:15 50
1:15 68	11:30 66	10:45 56
	2:00 67	11:30 59

Location- near teacher's desk on child's chair

8:45 Not shown	8:45 Not shown	8:30 Not shown
10:00 64	10:10 64	9:15 Not shown
11:45 67	2:00 68	10:45 Not shown
1:15 68		11:30 61

These above temperatures were at thermostat (hall wall)

Kindergarten

Thur.	Fri.
12:15 60	12:15 Thermostat not yet registering.
2:30 66	1:25 62 degrees

Fri. Jan. 9 Room 41

8:15 45
10:00 52
11:15 58
12:25 64
1:00 67
2:00 70
2:30 72

Room 45 Fri. Jan 9

Temperature didn't begin to register until 11:00.

Room 50

Wed. 8:45 Thermostat not yet registering.

Thur. 8:45 Thermostat not yet registering (begins to register at 55)

Fri. 8:45 43 degrees
11:30 58 degrees

Room 38

Wed. Jan. 8

8:45 Under 50° Not registering
11:30 58°
12:15 64°

Thur.

Approx.
same as
Wed.

Fri, Jan.8

8:45 45°
11:30 56°
1.45 64°

Senator PELL. The next witness is Mr. Charles Saunders, director of governmental relations, American Council on Education, accompanied by Mr. John Moran, vice president of facilities, Princeton University, and Paul Knapp, executive director of Physical Plant Administrators.

Welcome, and we particularly welcome the director of facilities of Princeton University.

STATEMENT OF CHARLES B. SAUNDERS, JR., DIRECTOR OF GOVERNMENTAL RELATIONS, AMERICAN COUNCIL ON EDUCATION, ACCOMPANIED BY JOHN P. MORAN, VICE PRESIDENT OF FACILITIES, PRINCETON UNIVERSITY AND PAUL KNAPP, EXECUTIVE DIRECTOR OF PHYSICAL PLANT ADMINISTRATION

Mr. SAUNDERS. Thank you, Mr. Chairman. I would like to express appreciation on behalf of nine member education associations for your leadership in sponsoring this kind of legislation.

I would like to introduce Mr. Moran on my right, and Mr. Paul Knapp, executive director of the Association of Physical Plant Administrators on my left. Both of them are active participants in the work of the energy task force, which is a cooperative effort by the higher education community to identify and finds solutions for the energy problems faced by our member institutions. They are prepared to answer detailed questions, but I would like first to make a few general observations about the bill.

We feel it should be an essential component in any comprehensive effort to develop a national energy policy. We think the bill is of major importance for three reasons.

First: It recognizes the danger posed for the maintenance of a strong educational system by the sharply rising costs of energy which rob financially pressed schools and colleges of funds vitally needed to sustain and improve the quality of educational services. And my statement cites some facts that I should call attention to. In the 2 years between 1973 and 1975, energy costs for institutions of higher education almost doubled despite a considerable reduction of energy consumption due to the efforts of the institutions to conserve energy to a greater extent.

Second: It recognizes that education is a significant and energy-intensive sector of the American economy which cannot be ignored in developing a sound energy policy.

Third: The bill recognizes that major energy savings for the Nation can result from special incentives for conservation in academic facilities. Now, you have already heard some data to that effect this morning, and I will simply note here that we estimate that a systematic approach to improving energy efficiency in colleges and universities could produce annual savings of $420 million.

So, we do endorse the bill. We feel it makes a significant contribution to the development of a sound national policy on energy, and we hope that this kind of assistance will be considered in any development by Congress in the coming months of legislation to deal with the Nation's energy problems.

I have submitted for the record, Mr. Chairman, several documents which are identified in my statement. I would simply like to ask Mr. Moran to speak briefly on the highlights of the latest higher education panel report, which is the latest information we have—it has not been published yet, it will be out within the next week or 2—but we do have a summary of the highlights, which show how energy cost increases and energy conservation programs have impacted on the Nation's colleges in fiscal years 1973 to 1975.

Mr. MORAN. Thank you very much, Senator Pell.

I would like to go briefly over the highlights of the survey which will be developed in the future.

First of all we learned that the energy costs of colleges and universities rose from $550 million to $944 million, a 70 percent increase, between 1973 and 1975.

At the same time the consumption of energy by colleges and universities, and other members of higher education has declined from 4.25 billion therms to 4.01 billion therms. The average cost increase during that period was 79 percent. Even though colleges, universities, and institutions of higher education are generally making efforts to conserve, the costs are rising for them. The average cost per student has gone, nationwide, from $79 to $124 for a student for that same period; and of course the increases were greater in particular parts of the country. For example, it went from $103 to $184 per student in the East.

Energy as a percentage of the budget of higher education has increased. The median percentage of the budget represented by energy rose from 2.7 percent in 1970 to 1973 to 3.6 percent in 1974 and 1975. So, higher education is facing a serious financial problem.

We are helping ourselves. The energy task force has developed an energy management workshop which has been given now to some 900 business officers and physical plant directors across the country, a 2½ day seminar. That will be available in published form, I think, in April.

In addition many universities and other institutions are engaged in programs to save money. The educational task force estimates that if all parts of higher education implement the improvements to buildings and systems they should, that some $420 million in savings would be made per year. I think that is an important point, that the savings continue year after year, which you well know.

The energy task force believes that savings in the range of 30 percent or so can be achieved. I would like to cite just a small example of my own institution in support of that 30 percent figure—30 to 40 percent figure. We have spent approximately $1.5 million on retrofits, and they will produce an annual saving of $1 million. And that is in just one modest size institution.

We are planning to take bids [illegible] simple supervisory system at the $3.5 million level, which [illegible] produce $500,000 in annual savings. When this program is completed it will produce a 33 percent reduction in our annual energy consumption. So, that tends to support that figure.

The problem is that these are very large numbers and the funds simply are not available across the country to institutions. Take institutions with endowments, they often have restricted endowments and cannot use the funds for that kind of purpose. So, I think it is important nationally that we do this, and it is important educationally that we do it.

Senator PELL. You do not enunciate very clearly.

Mr. MORAN. I am sorry, you want me to go back?

Senator PELL. In connection with the program, what is the program dealing with, where you say there is a 30 percent reduction?

Mr. MORAN. The program consists of two elements. One is called "quick fix" which involves little cost. The other is called "retrofit": Putting in time clocks; changing fans; changing fixed volume to regulable volume, that sort of thing. That is expensive, but it will bring substantial annual savings in costs.

The more sophisticated simple control system would cost $3.5 million, and would produce an additional $500,000 annual savings.

I was not citing this example so much for my own institution, but simply to support the national task force's overall figure of somewhere around 30- or 40-percent reduction that would occur nationally, if the funds are available to higher education to make these improvements, which are very expensive.

Senator PELL. Thank you very much indeed.

Mr. SAUNDERS. Senator, I might add that our data show for the fiscal years 1973 and 1975, that the rising costs, of course, are a national problem, although the increases are greatest in the east, a 94-percent increase in energy cost over the 2-year period. They are also very substantial in the South, an 84-percent increase; the Midwest, a 48-percent increase; the West, a 40-percent increase.

I would like to ask Mr. Knapp to briefly define the intent of the special report that the Association of Physical Plant Administrators prepared. It was a telephone survey, I believe, on the effect of last winter's severe cold on colleges and universities.

Mr. KNAPP. Senator Pell, I will not burden you with the entire report. I believe you have a copy of it.

Senator PELL. That will be included in full in the record.

Mr. KNAPP. Thank you very much.

As Mr. Saunders mentioned, we surveyed 26 schools during the week of January 31 across the country.

Senator PELL. Schools, or colleges?

Mr. KNAPP. Colleges and universities.

The findings were that only three of the schools had extended closings, the hardest hit in West Virginia; and, of course, there was the University of New York in Buffalo that was closed for 10 days. Except for Buffalo, the institutions in West Virginia were forced to close due to reduced gas allocations. The boilers were not equipped for the use of alternate fuels. I make the point there on the alternate fuel because so many of the institutions are not equipped to convert to an alternate fuel because that is a very expensive process.

Ironically, the conversion was made from coal to gas and oil on the basis of very good technical advice years ago; and now we have torn up our railroad sidings and reduced our coal storage yards to parking lots. So, it will be very expensive to convert back to coal if it becomes the choice fuel.

Of the schools that were open when contacted and had not canceled any student academic programs, even if entire buildings had to be shut down, classes were shifted elsewhere. I think that is typical of the diligence that colleges and universities have taken on their own, to make the best of a drastic situation.

Perhaps the most striking finding is not that the schools have taken a variety of steps to conserve fuel, but that most of those steps had already been taken before the most recent state of cold weather. On the one hand, that testifies to a deepening consensus about the need to conserve. This need to conserve, incidentally, began in the late sixties and early seventies not because of a moral need to conserve energy, but because of the escalating costs of fuel during that period. So many of our colleges and universities have been tackling that problem for the last several years.

On the other hand, the measures that are already being taken suggest that many schools have done as much as they can in terms of temperature, ventilation reduction, and consolidation of classes, and now are at the point where drastic curtailments may be necessary unless something is done. There are only two alternatives that can happen if funds are not provided. Either the quality of education itself will have to be curtailed, or the cost of education will have to be increased through increases in enrollment, or increased fees. Either one of these alternatives, I think, are the ones we would not hope to have.

We hope there is some way that we do not have to decrease the quality of education that the students get, nor increase the tuition, which would again decrease the number of students that would be able to take advantage of higher education opportunity.

Senator Pell. Thank you.

What is the proportion, Mr. Saunders, of the children that are in the 10 to 12 range, as compared to higher education?

Mr. Saunders. The enrollment in higher education is about 10 million—closer to 11 million now—in elementary and secondary now, I believe, 48 million.

Senator Pell. How many?

Mr. Saunders. Around 50 million.

Senator Pell. Fifty million. So, in other words, it is 11 million in higher education, and about 50 million in general education.

Now, from the viewpoint of this bill, if it is passed—and we hope it will be—as you know, it covers higher education. What proportion, based on this, of the people would benefit from this? In other words, $\frac{1}{6}$ to $\frac{5}{6}$ of general education, does that sound approximately fair to you?

Mr. Saunders. I would certainly agree, Senator, that any funds from this kind of legislation should be distributed equitably over the entire population, and no sector of education should get a disproportionate share.

I feel, though, that you have already provided in the legislation for comments and clearance of the State agencies, and I feel that gives ample opportunity for the States to make judgments. I am reluctant to suggest arbitrary set-asides because the situation will vary from State to State.

There would be no problem with the concept. It would be worked out, normally, as you provided in the bill, for consideration by the State agency of the total need within the State, because some States might have a very insubstantial need there, and it may be diverted to the colleges and universities within the State.

Senator PELL. What would be your reaction to the other thought that is going around in our minds, and that is that no funds should go to institutions which do not have windows that open; that have not made provisions for their thermostats that work from room to room to avoid wasteful master switching? In other words, this building for instance, which is the worst, would get no money under this program.

Mr. SAUNDERS. I would certainly support the concept. I think maybe Mr. Moran would like to speak to that. I know that has been the major consideration of the task force. I believe the task force feels that it would be essential to establish some kind of standard for energy conservation which institutions would have to meet before they would get funds.

Mr. MORAN. Senator Pell, the Energy Task Force, Subcommittee on Curriculum, Energy Management Workshop, considered at great length where the most important places were to put money in the most effective ways once you got beyond turning down thermostats, and so on. This very building you describe would really need the money, where you cannot open the windows, with high volume air systems. Generally, the buildings that were built during the 1960's, the great growth period in higher education are the energy hogs, are very wasteful. The solution may not be simply in replacing windows, which would be very expensive, but in controlling those fan systems so that they do not run when they are not needed. That they use as little air as possible, consistent with human comfort, as little outdoor air as possible. In such buildings, energy consumption can be reduced 50 to 60 percent. For example, in Ohio State they got down to 65 percent of what it was before through system modifications.

I would suggest that those kinds of buildings have a higher use of funds because they have a greater potential reduction in consumption.

Senator PELL. Thank you very much for your testimony, we appreciate it.

[The prepared statement of Mr. Saunders and additional material supplied for the record follows:]

TESTIMONY

to the

SENATE SUBCOMMITTEE ON EDUCATION

March 11, 1977

by

Charles B. Saunders, Jr.
Director of Governmental Relations
American Council on Education

We would like to express appreciation for the leadership Senator Pell has demonstrated in sponsoring S. 701, the Emergency Educational Assistance Act, on behalf of the American Association of Community and Junior Colleges, the American Association of State Colleges and Universities, the American Council on Education, the Association of American Universities, the Association of Jesuit Colleges and Universities, the National Association of College and University Business Officers, the National Association of Independent Colleges and Universities, the National Association of State Universities and Land-Grant Colleges, and the National Catholic Educational Association's College and University Department.

I am Charles B. Saunders, Jr., Director of Governmental Relations, of the American Council on Education. I am accompanied by John P. Moran, Vice President for Facilities at Princeton University, and Richard Anderson, Energy Project Manager, the Association of Physical Plant Administrators. Both are active participants in the work of the Energy Task Force, which is a cooperative effort by the higher education community to identify and find solutions for the energy problems faced by our member institutions. They are prepared to answer detailed questions on the nature and extent of these problems. First, however, I would like to make some general observations about S. 701:

The bill directly addresses the enormous impact of the nation's energy problems on schools and colleges throughout the country. Assistance to relieve this burden should, we believe, be provided as an essential component in any comprehensive effort to develop a national energy policy.

S. 701 is of major importance to the consideration of a national energy policy, for three reasons:

1. It recognizes the danger posed for the maintenance of a strong educational system by the sharply rising costs of energy which rob financially pressed schools and colleges of funds vitally needed to sustain and improve the quality of educational services.

In the two years between FY 1972 and 1974, energy costs for institutions of higher education almost doubled (from $555 million to $944 million)--despite a 6 percent reduction in energy consumption due to conservation efforts on individual campuses.

2. It recognizes that education is a significant, and energy-intensive, sector of the American economy which cannot be ignored in developing a sound energy policy.

It is estimated that the nonprofit sector accounts for approximately 10 percent of the nation's total energy consumption, and the largest share of this percentage is in education.

3. It recognizes that major energy savings for the nation can result from special incentives for conservation in academic facilities.

A systematic approach to improving the energy efficiency of higher education's total inventory of two billion gross square feet would cost an estimated $4 billion, but it would produce annual energy savings of $420 million, the equivalent of the entire annual energy consumption of the aluminum industry.

For these reasons, S. 701 makes a significant contribution toward the development of a sound national policy on energy. We endorse the general approach it proposes: to provide grants to make educational facilities more energy-efficient, to support projects which demonstrate successful energy conservation measures which can be replicated readily in other communities and institutions, and to make available technical assistance which will stimulate state-by-state planning and action to conserve energy in the nation's schools and colleges.

At this point we would like to submit for the record several documents providing detailed statistics and information about the impact of energy problems on higher education. These include (a) the highlights of the latest Higher Education Panel report on the impact of energy cost increases and energy conservation programs on colleges and universities, (b) a Special Investigative Report by the Association of Physical Plant Administrators of Universities and Colleges assessing the effect of this winter's severe weather conditions at selected institutions, and (c) a report by the Energy Task Force dated April 17, 1975, estimating higher education's capital investment needs for building rehabilitation for energy conservation purposes. (This report was the basis for the Federal Energy Administration's adoption of the three-step approach to energy conservation: "quick fix" which the institution can undertake immediately, "refit" which is the systematic updating of existing facilities, and "systems convert," the conversion of existing facilities to more sophisticated energy delivery systems.)

We appreciate the opportunity to testify, and we would be glad to answer any questions.

IMPACT OF ENERGY COST INCREASES AND ENERGY CONSERVATION PROGRAMS ON COLLEGES AND UNIVERSITIES

Frank J. Atelsek
Irene L. Gomberg

Higher Education Panel Reports
Number 31 February 1977

American Council on Education
Washington, D.C. 20036

A survey sponsored jointly by the U.S. Office of Education and the Energy Task Force, a group organized by the National Association of College and University Business Officers, the Association of Physical Plant Administrators, and the American Council on Education.

Highlights

National Estimates

- Between the 1972 - 73 academic year (which is FY 1973) and the 1974-75 academic year (FY 1975), tothl energy costs at colleges and universities rose from $555 million to $944 million, a 70 percent increase.
- Over the same period, total energy consumption decreased by 6 percent from 4.25 billion therms to 4.01 billion therms. (These figures make no adjustments for changes in student enrollment or in size of physical plant.)
- Overall energy costs averaged 13.1 cents per therm in 1972-73 and 22.5 cents per therm in 1974-75, a 79 percent increase.

Fuel Types

- The greatest increase in per-unit cost during the survey period occurred for oil (163 percent), followed by coal (126 percent). The per-unit cost of natural gas and purchased electricity increased less drastically (64 percent and 57 percent, respectively).
- In both years, natural gas provided 45 percent of total therms consumed; electricity and oil each provided about 20 percent; and coal, slightly more than 10 percent. The relative consumption of both oil and coal decreased slightly over the period.
- Electricity accounted for 55 cents of each energy dollar spent by higher education in 1974-75; oil and natural gas, about 18 cents each; and coal, 6 cents. The proportion spent for both oil and coal increased over the earlier year (1972-73).

Regional Estimates

- Institutions in the East and South experienced the greatest increases in total energy costs -- 94 percent and 84 percent, respectively. Smaller increases occurred in the Midwest (48 percent) and the West (40 percent).

- Ignoring increased enrollment and plant size, overall declines in energy consumption were highest in the South (7 percent), followed by the West and the Midwest (6 percent each), and the East (3 percent).
- The per-unit cost of energy increased most at institutions in the East (101 percent), from 16 cents to 33 cents per therm. The South averaged a 97 percent increase (from 12 cents to 23 cents); the Midwest, 58 percent (from 12 cents to 20 cents); and the West, 50 percent (from 12 cents to 18 cents).
- In 1974-75, the East paid the highest per-unit cost for all types of fuel except coal.
- Over the two-year period, the per-unit cost of both natural gas and coal rose most sharply in the South (100 percent and 185 percent, respectively).
- Oil was the predominant source of energy in the East (providing nearly 50 percent of the total therms consumed, whereas natural gas was the predominant source in the West (providing about 65 percent of total therms consumed), in the South (over 50 percent), and in the Midwest (just under 50 percent).

Cost Per Student

- Nationally the energy costs per student increased 57 percent between 1972-73 and 1974-75, from $79 to $124.
- The East experienced the greatest per student increase in energy costs: from $103 to $184, a 78 percent rise.
- The smallest increases occurred in the West, where energy costs were

lowest: from $57 per student in 1972-73, to $71 in 1974-75, a 25 percent increase.

Cost Per Square Foot

- The energy cost per square foot increased 57 percent from 1972-73 to 1974-75, from 28 cents to 43 cents.
- The largest increase occurred in the East: from 32 cents per square foot in the earlier year, to 58 cents per square foot in the later year, an 81 percent increase.
- Institutions in the West experienced the lowest increase: from 24 cents to 32 cents per square foot, a 30 percent increase.

Therms Per Square Foot

- Nationally, total energy consumption dropped over the period from 2.11 therms per square foot to 1.85 therms, a 12 percent decline. (These figures represent adjustment for changes in the amount of space serviced.)
- Institutions in the East reported a 9 percent reduction in energy consumption per square foot; figures reported by institutions in the other three regions more closely resembled the national figure.

Proportion of Current Fund Expenditures (CFE)

- The median percentage of CFE that went for energy rose from 2.7 percent in 1972-73 to 3.6 percent in 1974-75.
- Institutions in the East spent the largest proportions of CFE for energy (3.2 percent in the earlier year and 4.3 percent in the later year,), and those in the West spent the smallest proportions (2.1 percent in both years).

Primary Fuel Type

- Of the approximately 3,000 colleges and universities in the United

States, 53 percent relied on natural gas, 21 percent on oil, and 3 percent on coal as their primary source of energy.

- Institutions dependent primarily on oil suffered an 82 percent increase in total energy costs (from $132 to $239 million); those dependent primarily on coal, a 79 percent increase (from $51 to $92 million); and those dependent on natural gas, a 46 percent increase (from $267 to $389 million).
- Colleges and universities relying chiefly on oil experienced a 116 percent increase in their per-unit cost of energy, from 15 cents to 33 cents per therm.
- Institutions relying chiefly on either natural gas or coal experienced per-unit cost increases of 62 percent and 86 percent, respectively, bringing their total energy cost up to 19 cents per therm for each type of fuel.
- In 1974-75, oil-dependent institutions spent $194 per student for energy, those relying primarily on coal paid $151 per student, and those relying on natural gas paid $108 per student.

Type of Institution

- The increase in per-unit cost of energy was about the same--80 percent--at each of the three institutional types: doctoral-granting institutions and other comprehensive universities and colleges; other four-year colleges; and two-year colleges.
- In 1974-75, on average, doctoral and comprehensive institutions paid about 22 cents per therm, other four-year colleges averaged about 24 cents per therm, and two-year colleges paid about 30 cents per therm.
- Two-year colleges reduced their total energy consumption by 15 percent; doctoral and comprehensive institutions, by 5 percent; and other four-year colleges, by 3 percent.

- When adjustments are made for space changes during the survey period, the reduction in energy consumed turns out to be greater: 26 percent at two-year institutions, and about 10 percent at the two other categories of institutions.
- On a per-student basis, differences in the amounts of energy used varied widely among the three institutional types. In 1974-75, the energy used per student averaged about 750 therms at doctoral and comprehensive institutions, 570 therms at other four-year institutions, and about 200 therms at the two-year colleges.

Conservation Measures

- Three phases of conservation effort were defined: quick-fix, involving obvious measures that achieve significant energy savings at small cost; refit, involving engineering analysis and moderate amounts of capital investment; and systems convert, involving major changes in systems design, usually requiring substantial capital investment.
- Most (percent) of the 533 institutions responding to the survey have adopted those quick-fix measures which can be easily implemented by the physical plant manager. Few institutions (percent) have adopted those quick-fix practices requiring the cooperation of the institutional community.
- Only two of the nineteen refit measures listed in the survey questionnaire have been completely implementated by one-fifth or more of the responding institutions; over half the respondents believed that the various refit measures listed should be implemented further.
- One in five responding institutions has upgraded its boiler/chiller plants by converting to alternate fuel sources; 17 percent have begun to automate their power plants.

- In general, doctoral and comprehensive institutions have led other types of institutions in implementing conservation measures.
- Almost half of the responding institutions reported holding interruptible gas contracts; of these, 44 percent experienced some curtailment during 1974-75.

The Association of
Physical Plant Administrators
of Universities and Colleges

ELEVEN DUPONT CIRCLE
SUITE 250
WASHINGTON, D.C. 20036

APPA

SPECIAL INVESTIGATIVE REPORT:

ASSESSMENT OF THE SEVERE WEATHER CONDITIONS AND THE ENERGY SITUATION AS OF FEBRUARY 4, 1977 AT SELECTED UNIVERSITIES AND COLLEGES

APPA Energy Project Office

February 7, 1977

"An association, international in scope, founded in 1914, whose purpose is to develop professional standards in the administration, care, operation, planning and development of physical plants used by colleges and universities. . . ."

ENERGY
TASK FORCE

An Energy Task Force Supported Program;
American Council on Education, Association
of Physical Plant Administrators of
Universities and Colleges, National
Association of College and University
Business Officers.

Survey and Report Completed By

Steven Hoglund

Research Associate

APPA Energy Project Office

Send Inquiries to:

ASSOCIATION OF PHYSICAL PLANT ADMINISTRATORS
OF UNIVERSITIES AND COLLEGES

Energy Project Office

11 Dupont Circle

Suite 250

Washington, D.C. 20036

(202) 785-3062

SUMMARY OF FINDINGS

To assess the energy situation in states hardest hit by the weather, calls were placed during the week of January 31 to the Physical Plant directors at three schools in each of the following nine states: Maryland, Michigan, Minnesota, New York, Ohio, Pennsylvania, Virginia, West Virginia, Wisconsin. Information was obtained from 26 schools. The findings are summarized below, followed by a school-by-school report.

Extended closings were reported by only 3 schools. Hardest hit was West Liberty State College in West Virginia, forced to shut down for the entire month of February. Another West Virginia school, Morris Harvey College, plus the State University of New York at Buffalo each announced closings for 10 days beginning Friday, January 28. In addition, the three Pennsylvania schools contacted had an extended weekend closing at the beginning of February. The University of Cincinnati closed for one day because of weather, not energy shortage.

Three other colleges, Carleton (Minnesota), Heidelberg (Ohio) and the State University of New York at Plattsburgh benefited from previously extended Christmas vacations.

Except for Buffalo, closed by the sheer severity of the blizzards, the two other forced closings were due to reduced gas allocations where the boilers were not equipped to use alternate fuels. Several other schools were able to maintain operations by switching from gas to oil or coal. 7 switched all or part of their burners as a special measure this year. Three others had taken the step within the last few years. Very few unclosed schools expressed any concern about available fuel supplies.

Of the schools that were open when contacted, none had cancelled any student academic programs. Even when entire buildings had to be shut down to conserve fuel, classes were shifted elsewhere. More commonly, evening and Saturday classes were reduced in number or consolidated in fewer buildings. Significantly, only one college (Morris Harvey, West Virginia) had gone to a 4-day week; many others reported conservation measures designed specifically to avoid the need to shorten the school week.

Seven schools did report curtailments in ancillary educational programs or extra curricular activities, particularly community programs held on campus. Some examples: Ohio State cancelled continuing education, the University of Cincinnati had to close a vocational center, and Carnegie-Mellon postponed glass-blowing until spring. A few schools, like the University of Virginia and George Mason University, by closing recreational buildings after 6 p.m., forced groups to decide whether to reschedule or cancel activities.

While most schools acted voluntarily, some schools took steps to conserve based on emergency guidelines handed down by the State. In Maryland, all State facilities were given a list of stringent guidelines, including room temperature, water temperature, and ventilation reductions. Similar guidelines in Virginia were less stringent. In Minnesota, the governor called for reduction of temperatures and evening/weekend use of buildings in all colleges, public and private.

Perhaps the most striking finding is not that schools have been taking a variety of steps to conserve fuel, but that most of these steps had already been taken before the most recent spate of cold weather. On the one hand, this testifies to a deepening consensus about the need to conserve. Thanks to a campus-wide energy consciousness, the University of Cincinnati was able to take the unprecedented step of using campus parking facilities to store coal, Heidelberg College (Ohio) is getting students to help its maintenance crew to put plastic on all windows, and Roanoke College (Virginia) is scheduling an "energy conservation week" for discussions involving all students.

On the other hand, the range of measures already being taken suggests that many schools have done as much as they can, in terms of temperature and ventilation reductions and consolidation of classes, short of drastic curtailments. Because of reschedulings undertaken in prior years, for example, many schools have few evening or weekend classes to begin with. Several schools frankly concede that the energy they are presently using to stay open under more or less normal conditions is barely enough to keep pipes from freezing. At Ohio State, there is an informal contingency plan to close one dormitory and move 3,000 students to the commons areas of the other two dormitories.

But even if the fuel situation worsens, Ohio State -- like most of the schools contacted -- will find ways to avoid closing. Colleges with hospitals, with large numbers of resident students, with old buildings that cannot tolerate further temperature reductions, can simply not afford to close.

Schools are discussed by State, beginning on the following pages:

State	Page
Maryland	4
Ohio	6
Michigan	8
Pennsylvania	10
Minnesota	12
Wisconsin	14
West Virginia	15
Virginia	17
New York	19

Maryland

— Frostburg State, Frostburg

- o Closings: No.

- o Curtailments: None.

- o Fuel: Oil and gas (about 50-50). (Note: 31 separate boilers: 11 = gas only, 17 = oil only, 3 = dual oil-gas).

- o Supply: Oil: 4-5 days' supply for most of the affected buildings; gas: holding to 40% reduction in allotment, thanks to prior closing of major building for renovation.

- o Special Steps to Conserve:

  - Outside ventilation cut off where possible. (Note: Study of one building showed reduction of 50% in oil resulted.)

  - Night classes consolidated into a few buildings.

  - Required by State Department of General Services (DGS), in letter received January 31, 1977, to report back by February 3, 1977 on building-by-building steps to meet the following revisions to guidelines set forth by DGS on November 4, 1973:

    - o Temperature maximums: Indoors: 65° (days) and 55° (nights, weekends); corridors and public areas: 60° (days); storage areas: 40°. ("Be careful not to freeze pipes.")

    - o Concentration of evening classes, meetings.

    - o Consolidation of partially used areas to create more unused space.

    - o Ventilation: Discontinue at end of day, when possible during working hours.

    - o Fresh air supply: Reduce to 5% where possible during day; shut off at night.

    - o Reduce hot water to 90° except in dorms (120°) and dining halls/infirmaries (180°, set by health code).

- o Comments: Frostburg foresees difficulty in 40° setting in storage areas, concentration of community activities held on campus, and classroom consolidation (academic opposition).

-- University of Maryland, College Park

- Closings: No.
- Curtailments: None.
- Fuel: No. 6 oil. (Gas cut off in late December 1976.)
- Supply: No problem. (4-5 days' supply on hand.)
- Special Steps to Conserve: Requirements from Department of General Services for state facilities (see above for Frostburg State).

-- Loyola College, Baltimore

- Closings: No.
- Curtailments: None so far. (College on regular semester break when contacted.)
- Fuel: Oil and electricity (about 75-25). Only one building on natural gas.
- Supply: No problem. Normally a 10-day supply of oil on hand.
- Special Steps to Conserve:
  - Voluntarily reduced temperature to 60° in building using gas.
  - Central load shed control on electrical consumption.

Ohio

-- Ohio State, Columbus

- o Closings: No.
- o Curtailments: Continuing education and unofficial programs.
- o Fuel: Oil and gas (about 85-15). (Note: Last year was 60-40.)
- o Supply: Gas curtailed 85%, but no change in commitments made on fuel oil ordered last summer. Maintaining a 5-6 day supply.
- o Special Steps to Conserve:
    - Ventilation minimized.
    - Temperatures reduced (low 60's).
    - Consolidation of evening classes (begun a few years before); fewer than 25% of buildings now open at night.
    - Requested biological sciences to restrict the use of fume hoods.
- o Comments: If oil supplies reduced, have informal contingency plan to move 3,000 students in one dorm to the commons areas of the two other dorms presently housing 8,000. School lacks a sophisticated energy control system and many buildings are 100 years old. Conservation steps being taken now barely prevent pipes from freezing. Closing the school considered out of the question because of 1,000-bed hospital and threat to older buildings.

-- University of Cincinnati, Cincinnati

- o Closings: January 28, 1976 (Third one-day "snow holiday" called because of blizzard, this academic quarter.)
- o Curtailments: Closed on January 28, 2 buildings, not on central power plant system, with gas-only boilers. (College of Nursing and Health; Vocational Center.) Nursing classes initially called off, later rescheduled in other buildings.
- o Fuel: Coal (except for two buildings noted above.)
- o Supply: Gas: In two buildings, only enough to prevent freezing (70% curtailment in allotment); Coal: Normal silo and bunker storage allows only 2-3 days' supply. Because of delivery problems in extremely cold weather, arranged for dumping on university parking lots to assure additional 9-10 days' supply. Two months' supply on river bank, outside campus, would be threatened if sudden thaw caused river to flood.

- o Special Steps to Conserve:
  - Eliminated hot water in academic buildings (where water is for working only).
  - Requested people to walk up to 3 flights to reduce use of elevators.

-- Heidelberg College, Tiffin

- o Closings: No, but Christmas vacation extended by 10 days to January 24, 1977 to conserve fuel.
- o Curtailments: Some plays and a speech tournament cancelled.
- o Fuel: Primarily gas.
- o Fuel Supply: Confused situation. College maintains four gas accounts. One account, classed "commercial," includes 5 or 6 of the 17 major buildings on campus. Utility company first cut allocation by 40% before Christmas; that figure was changed to 50%, then 85% (February 1, 1977). There were no curtailments on the other three accounts until late in January, and the college was allowed to pool these three accounts and apply any savings to the category of commercial buildings. However, in late January, these three accounts were assessed a curtailment of 30%. Physical plant is unsure at present whether any savings can now be realized.
- o Special Steps to Conserve:
  - Two buildings (dorms) converted to fuel oil over Christmas holidays.
  - One academic building being converted from gas to coal (week of January 31).
  - Three academic buildings in "commercial" category being closed; classes shifted elsewhere.
  - Consolidation of classrooms in other buildings to allow entire floors to be closed.
  - Plastic being put on all windows. (Students are helping maintenance crew at night.)
  - Thermostats set at 65°.

Michigan

-- Central Michigan University, Mount Pleasant

- o Closings: No.
- o Curtailments: None.
- o Fuel: Gas.
- o Supply: Uninterruptable rate from gas company. Would only be affected if Michigan gas diverted out of state. Does have alternate, No. 5 oil (3-day supply on hand), and could switch over entirely in 2 hours, but has no commitment to buy.
- o Special Steps to Conserve:
  - Placed high priority on weather-stripping buildings, which had already begun.
  - Reduced thermostats to 60°.
  - Contingency plans (only): Reschedule Saturday classes: set weekend thermostats to 50°; shut down for two weeks, eliminate spring break, and add an extra week.

-- Albion College, Albion

- o Closings: No.
- o Curtailments: None.
- o Fuel: Gas and oil (capable both ways).
- o Supply: On interruptable gas service until March 1 or possibly April 1. Normally uses 100% gas first half of month. Will probably maintain present 100% oil for remainder of cooling season. Has 35-day supply on campus and foresees unlimited supply.
- o Special Steps to Conserve:
  - All thermostats set at 65° (day) and 55-60° (night).
  - Cut back use of electrical fixtures in offices and student areas (resulting in reduction in electricity demand by 14% from last year).

- University of Michigan, Ann Arbor
    - Closings: No.
    - Curtailments: None.
    - Fuel: Primarily gas.
    - Supply: Firm contact with well-endowed company. Would be cut back only if Michigan gas diverted out of state. On January 27, gas company requested reduction in gas use "to maximum extent possible in all operations," and in response the university shifted its central power plant (75% of capacity) to 30% No. 2 oil. Based on this level of oil use, the university has a 25 days' supply on hand and a pledge from the oil company to maintain this level. The remaining 25% of university capacity, small boilers presently on gas, could be converted to oil, but the oil company has no commitment to supply them.
    - Special Steps to Conserve: Began January 31 to lower thermostats to 65°.

Pennsylvania

-- Carnegie - Mellon University, Pittsburgh

- o Closings: Noon, Friday January 28, to noon, Monday January 31, 1977. All classes and social events cancelled, due to weather and low pressure at supplying steam plant.
- o Curtailments: Glass-blowing plants told, late January, to reschedule glass-blowing operation at later date, when weather improves.
- o Fuel: Steam, primarily from coal.
- o Supply: University is part owner of non-profit steam plant. Plant voluntarily reduced its gas use 33% and began using additional coal during last two weeks of January. Basic coal supply is adequate but delivery has been a recent problem due to the weather. (Normal 10-day supply reduced recently to 5 days.)
- o Special Steps to Conserve:
  - Thermostats reduced: In some occupied buildings to 60-65°, weekends to 50°.
  - Ventilation reduced in some buildings (end of January).
  - Evening classes concentrated in 1 or 2 buildings (done earlier - few classes to begin with).
- o Comments: Reduced thermostats and ventilation possible only in more modern buildings, approximately 33% of campus. Remaining older buildings cannot tolerate reductions because too much air seeps through windows; radiators would freeze.

— University of Pittsburgh, Pittsburgh

- o Closings: Noon Friday, January 28 through Monday, January 31, primarily due to approaching storm but also to protect boilers at local steam plant.
- o Curtailments: None.
- o Fuel: Steam, primarily from coal.
- o Supply: (See above, Carnegie - Mellon.)
- o Special Steps to Conserve: (Note: All steps have been taken in prior years as well.)
  - Thermostats lowered from 68° to 65°

- System refit work - to reduce fresh air intake and reclaim heat from exhaust.

- Shut down fan systems at night, relying on perimeter radiant heating.

- Domestic hot water eliminated or temperature "sharply reduced."

o Comments: In very old buildings with steam radiators and limited number of thermostats, the ability to regulate heat is quite limited. Some of steps taken above led to frozen water lines and broken pipes.

-- Clarion State College, Clarion

o Closings: All campus buildings except dormitories and dining halls closed from 5 p.m. Friday, January 28 to 8 a.m. Tuesday, February 1. Classes and extra-curricular activities cancelled.

o Curtailments: None.

o Fuel: Gas-oil (100% convertible). Normally 100% gas, but voluntarily went to 100% oil from January 22 to January 24, and to 50% oil from January 25 to noon, February 2, when 100% gas was resumed.

o Supply: Gas company has not set any maximum and did not require the conversion mentioned. Only problem using 100% oil: Small storage capacity (4 days).

o Special Steps to Conserve:

- Lowered thermostats to 62°, in general, for remainder of heating season.

- Cut exhaust fans to bare minimum.

o Comments: College has 33 buildings, each with separate controls. Appropriate thermostat setting requires considerable balancing, which will take weeks to complete.

Minnesota

— Carleton College, Northfield

- o Closings: No, but in past two years Carleton has had a 6-week break between Thanksgiving and New Years.
- o Curtailments: None.
- o Fuel: No. 6 oil. All boilers are dual gas-oil. In past three years had not used gas during months of December, January, and February. This season, however, have had very little gas, on interruptable basis, since October.
- o Supply: 14-16 days' on hand, based on present weather. As of January 15, Minnesota Pollution Control Agency permits use of higher-sulfur oil, which is more readily available than the No. 6 oil.
- o Special Steps to Conserve: Governor issued Phase 1 "Energy Emergency" measures January 15, applicable to all colleges and universities in the state.
  - Reduce temperatures to 65° (day) and 60° (night).
  - Reduce evening and weekend use of buildings. (Carleton has few Saturday classes and no evening classes to begin with.)

  Additional steps, also taken in prior years:

  - Severe reduction in ventilation.
  - Reduction in lighting.
  - Remodeling.

-- Moorhead State University, Moorhead

- o Closings: No.
- o Curtailments: Cancelled some extracurricular activities which did not pertain to university programs.
- o Fuel: No. 6 oil. (Dual oil-gas boilers.) Normally use oil from late October to mid-April, gas remainder of year.
- o Supply: In better shape than 1973. 8 days' supply on hand.
- o Special Steps to Conserve:
  - Set temperatures in all academic buildings at 62°, gyms 55°. (Note: had lowered further in 1973, causing problems.)

  - reduced intake of outside air to absolute minimums; fans run no more than one hour per day.
  - Closed down 100,000 square feet of buildings (about 7% of total) end of January. Included auditoriums, gym space, parts of student union, lounges in dormitories. Evening classes combined into fewer buildings.
  - Locked doors in many buildings with no vestibules; added vestibules where possible.
  - Discouraged the scheduling of classes or activities on weekends.
- Comments: Reducing fans and closing off areas resulted in a 22% fuel saving.

-- University of Minnesota, Minneapolis

- Closings: No.
- Curtailments: None.
- Fuel: 100% coal.
- Supply: Purchased for entire year. Campus and local stockpiles should last until April.
- Special Steps to Conserve:
  - Set thermostats at 65° (day) and 60° (night).
  - Closed down 22 classrooms through rescheduling of some classes.
  - Shut down many buildings on weekends (thanks to having far fewer Saturday classes than last year).
  - Covered hundreds of windows with plastic.
- Comments: University has one of the largest central control systems of any school in the country. Each year, more buildings are put on the central console.

  Studies indicate that coal use is up only 5.5% from last year, despite 23% colder weather.

Wisconsin

-- Lawrence University, Appleton

- Closings: No.
- Curtailments: None.
- Fuel: Oil. (Switched from 100% gas January 10, and expect to remain on oil through the first week of March. Have not used oil during heating season since 1973, when oil was used for 4 days.)
- Supply: Supplier has assured college of ample supply. Storage tanks can hold only 2 days' supply, but oil is delivered every other day.
- Special Steps to Conserve:
  - Set thermostats at 65° in all academic buildings.
  - Shut fans off in all large buildings.
  - Cut domestic hot water temperature from 140° to 120°.

-- University of Wisconsin, Madison

- Closings: No.
- Curtailments: None.
- Fuel: Primarily coal. (Converted boilers two years ago to be able to use coal, oil or gas.)
- Supply: Coal: Enough on hand to go through entire winter. Gas: Had been on interruptable gas but can now get no gas at all. Oil: 3 days' supply in storage at main plant, but current difficulty in getting oil results in 100% coal use at main plant, contrary to emission standards of State Department of Natural Resources which call for 10% oil in the mix.
- Special Steps to Conserve:
  - Set thermostats in steam-fed buildings at 65°, in the few small buildings using oil, at 63°.
  - Shut off ventilation nights and weekends in those buildings controlled by computer.
- Comments: The university has to keep heat on for custodial personnel to clean during the third shift, which limits the amount of conservation through temperature reduction. In addition, since classroom space is limited to begin with, there is no practical way to reschedule or consolidate classes. Finally, reducing ventilation has led to many freeze-ups and broken pipes in outside walls.

West Virginia

-- West Virginia University, Morgantown

- o Closings: No. (But branch college, Potomac State (Keyser, West Virginia), solely gas, forced to close January 28 for at least two weeks.)
- o Curtailments: None.
- o Fuel: 100% coal. (Voluntarily switched from 100% gas, late January. May remain on coal for entire calendar year.)
- o Supply: Contract provides for entire year. Large storage in bins, silos.
- o Special Steps to Conserve:
  - Thermostats reduced on January 28 to 64°.
  - Ventilation reduced by about 65%.
- o Comments: University had foresight not to convert fully to gas when it redesigned burner 10 years ago. Thanks to its medical center, university is not given a "commercial" rating, which would curtail its fuel. However, energy savings at night are limited because of large amount of campus research.

  Branch campus, Potomac State, had been assured of gas by supplier if it could keep temperatures at 62°, but supplier then cut allotment forcing Potomac State to cut its temperatures to 40° and close. (Potomac State rated "commercial.")

-- Morris Harvey College, Charleston

- o Closings: 11 a.m. Monday, January 31. Hope to reopen Monday, February 7.
- o Curtailments: Had instituted 4-day class schedule the day the college was forced to close. Will reopen on 4-day schedule.
- o Fuel: Gas.
- o Supply: On January 24, power company had told college it would have to cut back its allotment to 60% for February and March. Based on this, the college had begun to take the steps listed below. Subsequently, however, the Federal Power Commission diverted gas to other states, and the power company on January 31 told the college it could provide "plant protection gas" only until February 9. School hopes Public Service Commission ruling, due February 7, will allow it to reopen on February 7.

- o Special Steps to Conserve:
  - 4-day class schedule.
  - Temperatures set at 62-64° in classrooms, 50° in activity areas.

-- West Liberty State College, West Liberty

- o Closings: Entire month of February.
- o Curtailments: All classes and programs suspended until March.
- o Fuel: Primarily gas. (Main academic buildings and 7 of 11 dormitories.)
- o Supply: College had been operating academic areas with 40% curtailment in gas, without great difficulty, as it had done a year ago. On January 14, the supplier announced a further reduction of 60%, which forced the closing. College is not sure it can meet this requirement even shut down.
- o Special Steps to Conserve: Once the college reopens, classes and offices will be vastly consolidated. Faculty offices will be moved from gas-heated buildings to electric-heated buildings (Science Center, Fine Arts Building). One or two entire floors of the 4-story main academic building will remain closed.

Virginia

— University of Virginia, Charlottesville

- o Closings: No.
- o Curtailments: All athletic and recreational activities that would keep buildings open after 6 p.m.
- o Fuel: 70% coal, 30% oil. (Had been on interruptable gas until mid-December when all gas was denied.)
- o Supply: 30 days' supply of coal on hand for normal seasonal temperatures; 40-45 days' supply of oil on hand. (Note: School has had some difficulty in coal deliveries, due to freezeups.)
- o Special Steps to Conserve: The first three steps listed below were taken February 2, to last for a two-week period. The first two steps may be continued indefinitely. The last two steps have been taken in prior years, as well.
  - Evening classes consolidated into few buildings. Temperatures reduced from 65° to 55° at 11 p.m.
  - In buildings vacated at night, temperatures reduced to 55° at 6 p.m.
  - Reduced evening and weekend hours in all libraries.
  - Hot water eliminated from some buildings.
  - Reduced ventilation.

— Roanoke College, Salem

- o Closings: No.
- o Curtailments: None.
- o Fuel: Primar[illegible] gas (80%, nonconvertible). Also runs 7 burners on coal, 3 on oil, [illegible] on electricity.
- o Supply: On noninterruptable gas. Supplier has not notified college of any reductions or restrictions. Coal is in abundance but cannot be used in the gas burners.
- o Special Steps to Conserve (all voluntary):
  - Temperatures set at 65° (day) and 60° (night).
  - Hot water reduced to 120°.

    - Boiler temperatures reduced.
    - Nonacademic evening activities rescheduled to coincide with night classes to utilize heated buildings.
    - Memoranda sent by Physical Plant Director to student senate members, establishing an "energy conservation week" in mid-February involving discussions among all students.

  - Comments: Two steps taken in past years have helped the college conserve energy. Three years ago, 3 of 12 dormitories were closed down; two years ago, classes were consolidated.

- George Mason University, Fairfax
  - Closings: No.
  - Curtailments: Student unions closed at 6 p.m. Community activities in physical education building cancelled.
  - Fuel: No. 2 and No. 5 oil.
  - Supply: Continuing normally, except for slight reduction in inventory. Supplier has always notified the school in prior years when problems developed, and there have been no calls this winter.
  - Special Steps to Conserve:
    - Thermostats reduced from 68° to 65° (Governor's edict, dated January 17).
    - Boiler temperatures reduced from 190° to 165°.
    - Full recirculation of air (no outside air) whenever outside temperature drops below 40°.
    - Relocated research activities from outlying buildings and set thermostats in those buildings at 50°.
    - Reduced air handling and blowers for longer periods of time.
  - Comments: Effectiveness of steps above shown in energy consumption on two separate days (each 36-degree days) before and after the steps taken:

    January 14 - 114 million BTUs
    January 28 - 61 million BTUs

New York

-- State University of New York, Buffalo

- o Closings: Friday morning, January 28, until Monday, February 6.

  No further information obtained. University offices closed.

-- University of Rochester, Rochester

- o Closings: No.
- o Curtailments: None.
- o Fuel: Coal (80-85%) and No. 6 oil (15-20%). Fuel can be burned in varying proportions.
- o Supply: 30 days' supply on hand. Oil deliveries have not been interrupted, but coal cars have been recently delayed in arriving from snowed-in areas, especially Buffalo.
- o Special Steps to Conserve: Thermostats set at 68° (day), 55° (night).
- o Comments: University considers itself fortunate that it was not connected to gas. At present, there is no fully functioning central control system, and 20% more coal than last year is being burned. However, a remote central control is being set up. University is pledged to stay open because it maintains a large hospital.

-- State University of New York, Plattsburgh

- o Closings: No, but Christmas recess lasted until late January.
- o Curtailments: None.
- o Fuel: Primarily No. 6 oil. (One building on electric heating.)
- o Supply: 20 days' supply on hand. School has had no problem getting fuel from supplier.
- o Special Steps to Conserve:
  - Installed Honeywell computer system, in order to be able to shut fans off at night.
  - In process of installing added insulation, storm windows.
  - Thermostats now set at 68° (days) and 55-60° (nights).
- o Comments: The Plattsburgh area has had very little snow this winter, in contrast to the heavy snows just 50 miles to the west.

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ENERGY
TASK FORCE

ENERGY CONSERVATION

The Capital Investment Needs for Building Rehabilitation for Non-Profit Educational Institutions

An analysis by the Energy Task Force

ENERGY TASK FORCE:

Ray E. Green, Jr.
Florida State University

Elmo Morgan
University of California, Berkeley

Gae P. Russo
Kent State University

Theodore B. Simon
Michigan State University

John F. Embersits, Chairman
Yale University

Energy Task Force
Paper #2
April 17, 1975

one dupont circle washington, d. c. 20036

INTRODUCTION

This paper is one of several reports to be issued by a non-profit education Energy Task Force. This Task Force, created by the National Association of College and University Business Officers (NACUBO) and the Association of Physical Plant Administrators (APPA) and sanctioned by the American Council on Education (ACE), is responsible for assessing the impact of energy supply and cost trends upon non-profit educational institutions. The Task Force is exploring with federal agencies and congressional leadership ways by which the educational sector can be sensibly integrated into emerging national energy policy.

The purpose of this report is to focus attention on one of the most critical energy problems presently facing educational institutions: the need to render educational facilities more energy efficient through a program of capital investments focused upon the rehabilitation of existing buildings. The report identifies the advantages offered by federal support of a building rehabilitation program which reduces both energy consumption and costs in the educational sector. The report also outlines a phased investment plan for educational institutions involving progressive levels of technical sophistication and expenditure.

Although the Task Force has only been operational since early 1975, it is already clear that the highest priority must be assigned to the need for building rehabilitation funds to assist educational institutions in their attempts to reduce energy consumption and costs. Such priority is not only essential for the economic relief of educational institutions, but is also important in the national effort to achieve a goal of energy independence through energy conservation.

While the quantitative data included in this analysis specifically addresses the needs of higher education, it is self-evident that primary and secondary schools are faced with problems of the same magnitude. The Task Force is in the process of gathering information in order to more accurately assess the energy consumption requirements of the public and private pre-college institutions. It is clear, however, to the Task Force that capital expenditures in elementary and secondary schools will be required to reduce energy consumption and therefore the costs of education. It is also obvious to the Task Force that in national energy conservation terms alone, the consumption reduction potential in elementary and secondary schools is enormous, though the data presently on hand renders a precise estimate impossible at this time.

II. SUMMARY AND CONCLUSIONS

The absence of a national energy policy during the past three decades not only lulled the nation into a false sense of security with regard to energy matters, but also resulted in capital expansion that will, if not corrected, work to the detriment of the national goals of energy independence and economic stability. The past decades witnessed a rapid growth and expansion of educational institutions to keep pace with the rising demands of a growing student population and the high national priority given to research and scientific activity. During this era of relatively inexpensive energy, buildings were erected with minimal concerns for efficient energy consumption.

Events of the 1970s have rudely shaken this delicate imbalance. The leveling of student enrollment challenges the established assumption that growth is good. Environmental regulations, predicted energy shortages, skyrocketing energy costs and emerging national energy policy require a reassessment and redirection of educational facility resources.

The time has arrived to reallocate funds away from the construction of new facilities. Future funding must focus on the rehabilitation of existing facilities to render them energy efficient and cost effective.

The consolidation of resources must receive primary attention be they energy resources, educational operating budgets, tuition payments or facility operating expenses. The allocation of building rehabilitation funds to educational institutions offers a unique opportunity to make substantial progress toward the national goals of energy independence and economic stabilization. The proven opportunities for energy consumption reduction through renovations of facilities, the existing technical expertise in conservation practices, and the established pattern of information and experience sharing places the edubational sector in an enviable position to maximize the return on dollars allocated for energy conservation.

Rehabilitation plans and programs ready for execution but awaiting funding can immediately create new construction jobs in an industry hard hit by unemployment. Moreover this construction activity will not result in new energy demands but will reduce energy consumption and thus the pressures upon school operating budgets and tuitions.

The federal government can be the catalytic agent in the achievement of these energy conservation and economic stabilization benefits through the release of funds to support building rehabilitation investments. Capital funds are badly needed to afford institutions the opportunity to capitalize upon energy conservation opportunities; opportunities which are currently available and nationally important but financially unattainable without capital support.

1. Non-profit institutions of higher education spend more than $1.2 billion annually on energy, or an equivalent of 100 million barrels of fuel oil per year. In the national pursuit of the goal of energy independence, the consumption reduction potential of such a significant category of user cannot be overlooked.

2. Meteoric increases in the cost of energy, building systems designed and constructed to consume inexpensive energy, complex environmental regulations and the absence of a national energy policy have weakened the already precariously balanced financial positions of many institutions.

3. Non-profit educational institutions continue to be excluded from all of the proposed economic relief plans set forth by the Administration and Congress such as credits for energy investments and capital support for conversion to more efficient energy sources. Such an oversight aggravates the dilemma of increased energy costs.

4. The inflationary impact of the rising costs of higher education has staggered many state and local governments, taxpayers, and tuition-paying parents, thus threatening to price higher education beyond the reach of many students. A reduction in operating costs for energy within educational budgets will have a positive deflationary effect on many Americans while providing the additional advantage of further stimulating energy conservation activities toward the goal of national energy self-sufficiency.

5. Energy consumed within educational institutions is essentially non-discretionary, supporting such high priority functions as food processing, space heating and medical service at the teaching, research and clinical levels.

6. Field experience within non-profit institutions of higher education indicates that a properly phased program of investments of approximately $2.00 per gross sq. ft. can reduce energy consumption by at least 25%, with a potential reduction as high as 40% in some of the more sophisticated research institutions.

7. Due to the clear pattern of mutual cooperation and information sharing which has existed among educational institutions, funds spent for energy conservation would be uniquely amplified in a manner unavailable in the more competitive sectors of the energy consuming economy.

8. The total size of existing facilities at institutions of higher education amounts to approximately 1.9 billion sq. ft. To realize consumption reductions in the range of 25-40% funds of $3.8 billion will

be required based on a rehabilitation investment of $2.00 per gross sq.ft. Existing federal appropriation mechanisms provide several opportunities for this type of funding especially in the area of matching facilities grants.

9. Approximately 265,000 construction jobs would be created by the suggested $3.8 billion building rehabilitation program, based upon AFL/CIO estimated 70,000 construction jobs per $1 billion of construction expenditures; this economic stimulus to be achieved by an investment program which will reduce both energy consumption and the cost of education nationally.

III. Program for Building Rehabilitation Investments

A. Financial Criteria and Capital Needs

It is axiomatic that energy conservation investments must meet the return on investment criteria fundamental to any capital expenditure decision. Building rehabilitation expenditures are no exception to this principle. Fortunately, the rates of return on rehabilitation expenditures are extremely attractive as measured in terms of their cost savings and cost avoidance potential. Investment payouts within three to five years are the rule rather than the exception for intelligently planned conservation rehabilitation programs.

Regrettably, there has been a serious shortage of capital funds available to educational institutions for rehabilitation investments.

Elimination of this shortage of capital funds requires that a stronger case be made for the value of such investments than has been made in the past. The preliminary surveys of the Energy Task Force have revealed impressive conservation performances across many institutions; performances which deserve recognition and can provide impetus for further conservation activity. Perhaps even more importantly, these positive energy conservation performances substantiate the growing need for capital in order to accelerate the trend toward energy conservation investments.

B. Phasing of Rehabilitation Investments

Review of higher education's institutional conservation case histories discloses a three-phase pattern of building investment programs which affords energy consumption reduction opportunities at varying levels of expenditure. The three phases may be classified as:

Phase	Consumption Reduction	Level of Expenditure Per Sq. Ft.
QUICK FIX	10%	$ .00
REFIT	20 - 25% (including QUICK FIX)	.25-1.20
SYSTEMS CONVERT	30 - 40% (including REFIT)	1.20-2.00

A vital component of this phased energy consumption reduction would be the development of a method for reviewing the consumption reduction progress of a specific institution so that federal funding agencies could be assured of an optimum return on a capital, rehabilitation investment. Such mechanisms as inter-institutional review groups, state and federal energy audits and site visits by a board whose membership would include university administrators, federal energy experts and representatives of the funding source would insure the effective allocation and proper phasing of rehabilitation funds. An institution would be required to prove the successful establishment of a QUICK FIX program prior to receiving REFIT funds and would also have to demonstrate intelligent and productive use of REFIT monies before receiving SYSTEMS CONVERT aid.

C. PHASE 1 - QUICK FIX

Definition and Cost:

This initial phase involves basic and important energy savings which are easily attainable at negligible cost. Non-technical energy conservation measures such as lowered temperatures and regular preventive maintenance will quickly eliminate obvious energy waste and result in energy consumption reductions of at least 10% for most institutions. Minimal lead time is required for the implementation of a QUICK FIX program, especially if campus-wide cooperation can be elicited for achieving such vital consumption reductions.

It is clear from EXHIBIT I that institutions of higher education are making significant progress in their efforts to conserve energy. Most of the schools represented in EXHIBIT I have already implemented successful QUICK FIX programs and are moving into more sophisticated conservation activities as evidenced by an average energy consumption reduction of 17.53% for the four-year schools and 12.17% for the two-year schools. Further consumption reductions, which are attainable and must be realized, will require capital support.

EXAMPLES: QUICK FIX

1. Specific temperature ranges and thermostat settings:

   65-68° Winter
   75-80° Summer

2. Reduction in illumination levels and lamp wattage.
3. Night and weekend building shutdowns.
4. Consolidation of activities into fewer buildings, particularly during evenings and weekends.
5. Scheduling of vacations during energy intensive periods.
6. Restrictive policy on appliance usage and air conditioning installation.
7. Reduction of hot water temperature.
8. Work schedule adjustments to maximize daylight working hours.
9. Reduction of building heat leakage using blinds and drapes.
10. Maintenance review of existing energy systems:
    - a) Inspections of steam traps.
    - b) Inspection of valve functions and air filtration systems.
    - c) Installation of stack emission monitors.
11. Total involvement of the entire institutional community:
    - a) Faculty, staff, student energy committee.
    - b) Appointment of building energy monitors.
    - c) Energy briefing sessions with building occupants.

D. PHASE 2 - REFIT

Definition and Costs:

This second phase goes beyond the simple steps taken in the QUICK FIX stage. The expected consumption reduction of 20-25% requires a capital investment of approximately $.25-1.20 per gross sq.ft. Greater attention in this phase must be devoted to the development of technical studies in an effort to diagnose the differing types and levels of energy consumption within an institution prior to committing capital to a specific investment option.

EXHIBIT I illustrates that a number of institutions have entered the REFIT phase using modest amounts of self-generated capital funds. Regrettably, a shortage of available capital has hampered many institutions from executing further conservation plans; plans which are ready for immediate implementation requiring only capital support

EXAMPLES: REFIT

1. Energy Technical Studies:
    - a) Classification of buildings by function, energy consumption and sq.ft. costs.
    - b) Review of existing mechanical systems and controls to identify capital investment options.
    - c) Infra-red aerial photographic survey to identify heat loss.
    - d) Review of electrical rate structures, power factors, load profiles and demand peaks.
    - e) Development of energy efficient space allocation practices.
2. Modification of Lighting Systems:
    - a) Conversion from incandescent to fluorescent fixtures.
    - b) Utilization of time clocks on lighting systems.
    - c) Revision of light switch circuitry to reduce overlighting.
3. Reduction of Heating and Air Conditioning System Losses:
    - a) Increase steam line insulation.
    - b) Roof and wall insulation.
    - c) Weatherstripping, storm windows, caulking, sun screens, blinds.
4. Refinement of HVAC Control Systems:
    - a) Rezoning of heating systems.
    - b) Installation of timers on exhaust and air handling systems.
    - c) Installation of variable speed drives on motors.
    - d) Installation of motorized steam valves.
    - e) Reduction of fresh air makeup.

E. PHASE 3 - SYSTEMS CONVERT

Definition and Costs:

The third and most sophisticated level of conservation investment, SYSTEMS CONVERT, requires capital expenditure for engineering and other technical studies and substantial conversion of building systems in order to achieve this dramatic consumption reduction. An additional 10-15% reduction can be achieved after the first and second phases, at an incremental cost of approximately $.80 per gross sq.ft.

The cumulative impact of the three phases results in an institutional consumption reduction ranging from 30% to 40% at a total cost which would not exceed $2.00 per gross sq.ft. It is important to recognize that not all institutions or all buildings within a given institution can benefit from this highly technical SYSTEMS CONVERT phase. However, significant savings of energy as a result of SYSTEMS CONVERT investments would accrue to institutions engaged in basic scientific research and in the delivery of health care at the research and clinical levels. Such institutions consume a major portion of the total energy used within the educational sector. As such, these institutions represent desirable focal points for investment from a national energy conservation standpoint irrespective of the additional incentive of lowered operating costs within the institution.

EXAMPLES: SYSTEMS CONVERT

1. Installation of central computerized controls and building monitoring systems.
2. Installation of waste heat recovery systems.
3. Conversion of Building Systems:
    a) Solar energy systems.
    b) Independently zoned environment controls for laboratories and other specialized space.
    c) Rewiring of major electrical systems to minimize demand changes and avoid establishing new peaks.
4. Upgrading of Primary Boiler and Chiller Plants:
    a) Conversion to alternate fuel sources.
    b) Automation of power plants.
    c) Utilization of solid waste recovery fuel systems.

IV. Funding of Building Rehabilitation

Achievement of an energy consumption reduction in the range of 25-40% in educational facilities will require an investment of $2.00 per gross sq.ft. This amount, allocated to the 1.9 billion sq.ft. of existing higher education facilities creates a capital need of $3.8 billion for energy related building rehabilitation.

Neither all institutions nor all buildings within an institution require $2.00 per sq.ft. to achieve optimum consumption reductions. The variance of investment needs across institutions suggests the need for the careful phasing of funds over a period of years to insure the allocation of available rehabilitation funds to the most desirable conservation opportunities. The development and continuing refinement of energy conservation technology is a predictable phenomenon. The cumulative experience of educational institutions in the field of energy conservation will continue to provide energy opportunities unknown today but highly feasible and desirable for the future. Educational institutions, once having initiated aggressive energy conservation programs, will thus be motivated to achieve progressively greater consumption and energy cost reductions under the continuing stimulus of visible funding sources to finance building rehabilitation investments.

In sum, the rationale of phasing rehabilitation funding over an extended period, such as five years, is essential to insure investment in the most attractive energy conservation options, and to do so at a pace that will neither outstrip emerging technology nor an institution's technical capacity to wisely invest funds available to that institution. The funding of such investments must start somewhere. To date, federal energy related funding assistance which has been provided to most all sectors of the economy has not been provided to non-profit educational institutions. The need for this capital is great; the return in energy conservation is assured. Institutions are willing and technically able. What is now required is an understanding of these needs by federal administrators and Congress, and a commitment to allocate resources to assist non-profit educational institutions.

April 17, 1975

AMERICAN COUNCIL ON EDUCATION
NACUBO – APPA ENERGY TASK FORCE
ENERGY CONSUMPTION SURVEY

March 27, 1975

EXHIBIT I

College or University	Primary Fuel Type	Secondary Fuel Type	Other Purchased Energy Types	FISCAL YEAR 69-70		FISCAL YEAR 74-75 PROJ.		Energy Cost Ratio 74-75 over 69-70	Percentage Reduction In Energy Consumption Due To Conservation Program	Enrollment H.E.G.I.S. - F.T.E.	Institutional Gross Square Footage Serviced	Length of School Year In Months	Type of Institution*
				Total Energy Cost In Dollars	Energy Cost As A Percentage Of Total Institutional Expenditures	Total Energy Cost In Dollars	Energy Cost As A Percentage of Total Institutional Expenditures						
CHICAGO	GAS	OIL	ELEC	$ 1,415,991	1.20%	$ 3,733,994	2.00%	206%	8.96%	9,064	7,645,788	11	CD1
DARTMOUTH	OIL		ELEC	$ 425,000		$ 1,500,000		352%				9	CD1
EMORY	GAS	OIL	ELEC	$ 640,000		$ 1,783,425		279%	21.00%	6,215	3,950,000	12	CD1
HOWARD	OIL		ELEC	$ 582,120		$ 2,400,000		412%		10,000		12	CD1
ILLINOIS-URBANA	OIL	OIL	ELEC	$ 2,349,209	1.30%	$ 6,659,060	3.12%	283%	25.23%	35,400	13,188,666	12	CD2
INDIANA	COAL	GAS	ELEC	$ 2,011,326	3.61%	$ 3,491,171	4.28%	174%	8.33%	27,402	11,922,590	12	CD2
INDIANA-PURDUE INDIANAPOLIS	GAS	OIL	E+STM	$ 859,270	1.52%	$ 2,082,096	3.38%	242%		12,336	3,337,022	12	CD2
IOWA	OIL	COAL	ELEC	$ 1,372,406	.90%	$ 5,465,400	2.30%	398%	12.00%	21,961	7,660,000	12	CD2
JOHNS HOPKINS	GAS	OIL	ELEC	$ 421,495	2.20%	$ 1,271,604	5.60%	302%	20.00%	4,767	1,485,000	12	CD1
KENT STATE	GAS	COAL	ELEC	$ 1,118,413	2.10%	$ 1,836,306	3.10%	164%	11.00%	17,336	4,752,657	12	CD2
MARQUETTE	GAS		E+STM	$ 511,579	2.20%	$ 732,774	2.20%	143%		8,560	2,106,000	12	C 1
MICHIGAN	GAS	OIL	ELEC	$ 2,900,000	.90%	$ 6,900,000	1.80%	238%	18.00%	33,583	17,100,000	12	CD2
MICHIGAN STATE	GAS	COAL	ELEC	$ 2,432,358	1.44%	$ 6,332,080	2.81%	260%	17.10%	43,459	15,643,444	12	CD2
MIDDLEBURY	OIL	COAL	ELEC	$ 172,314	1.40%	$ 468,509	3.50%	272%	25.00%	1,870	977,111	12	A 1
MINNESOTA	GAS	COAL	ELEC	$ 1,992,592	.86%	$ 5,678,364	1.68%	285%	17.80%	42,970	13,408,437	12	CD2
MT HOLYOKE	OIL		ELEC	$ 184,000	2.07%	$ 526,000	4.12%	286%	20.00%	1,923	1,597,000	9	A 1
NORTHWESTERN	GAS		ELEC	$ 710,679	.91%	$ 1,940,555	1.73%	273%	9.60%	9,567	4,730,232	12	CD1
NOTRE DAME	COAL	GAS	ELEC	$ 521,467	1.10%	$ 1,530,900	2.71%	293%	5.00%	8,540	4,806,945	10	CD1

* A = 4 YEAR COLLEGE   C = 4 YEAR UNIVERSITY   1 = PRIVATE
B = 2 YEAR COLLEGE   D = PROFESSIONAL   2 = PUBLIC

UNIVERSITIES AND 4 YEAR COLLEGES
SHEET 1 OF 2

AMERICAN COUNCIL ON EDUCATION
NACUBO - APPA ENERGY TASK FORCE
ENERGY CONSUMPTION SURVEY

March 27, 1975

EXHIBIT I

College or University	Primary Fuel Type	Secondary Fuel Type	Other Purchased Energy Types	FISCAL YEAR 69-70 Total Energy Cost In Dollars	FISCAL YEAR 69-70 Energy Cost As A Percentage Of Total Institutional Expenditures	FISCAL YEAR 74-75 (EST.) Total Energy Cost In Dollars	FISCAL YEAR 74-75 (EST.) Energy Cost As A Percentage Of Total Institutional Expenditures	Energy Cost Ratio 74-75 over 69-70	Percentage Reduction In Energy Consumption Due To Conservation Program	Enrollment H.E.G.I.S. - F.T.E.	Institutional Gross Square Footage Serviced	Length of School Year In Months	Type of Institution*
OHIO STATE	GAS	OIL	ELEC	$ 2,636,981	1.26%	$ 5,887,51[illegible]	1.96%	223%	34.30%	50,000	15,884,761	12	CO2
PURDUE	COAL	OIL	ELEC	$ 2,314,509		$ 5,163,000		223%		27,400		12	CO2
ROCKEFELLER	OIL	GAS	E-STM	$ 500,000	2.40%	$ 2,250,000	7.00%	450%	10.00%			12	CO1
SOUTHERN CALIF.	GAS	OIL	ELEC	$ 558,400	.70%	$ 1,660,208	1.10%	297%	25.00%	13,365	4,918,468	10.5	C 1
STANFORD	GAS	OIL	ELEC	$ 954,000	1.50%	$ 2,076,00[illegible]	2.60%	217%	18.00%	12,500	3,850,000	11	C 1
TULANE	GAS		ELEC	$ 1,000,000	2.10%	$ 1,140,000	2.00%	114%	10.00%	7,000	1,000,000	12	CO1
U OF CALIF													
BERKELEY	GAS	OIL	ELEC	$ 1,297,131	.80%	$ 3,194,867	1.50%	246%	16.00%	29,730	11,700,698	10.5	C 2
DAVIS	GAS	OIL	ELEC	$ 812,369	1.00%	$ 1,553,485	1.00%	191%	10.00%	16,239	6,022,500	11	C 2
IRVINE	GAS	OIL	ELEC	$ 328,061	1.20%	$ 1,142,158	2.20%	348%	26.00%	6,764	2,350,922	9	C 2
LOS ANGELES	GAS	OIL	ELEC	$ 1,872,476	1.00%	$ 4,803,66[illegible]	1.60%	257%	25.00%	31,966	12,701,795	12	C 2
SAN DIEGO	GAS	OIL	ELEC	$ 67,400	1.40%	$ 119,80[illegible]	1.60%	178%	22.50%	1,442	738,762	11	C 2
SAN FRAN.	GAS	OIL	ELEC	$ 546,888	.70%	$ 1,126,250	.80%	206%	10.00%	2,992	3,019,242	12	D 2
SANTA BARB.	GAS	PROP	ELEC	$ 663,048	1.60%	$ 1,400,000	2.40%	211%	22.00%	13,277	3,524,100	9	C 2
UTAH	GAS	COAL	ELEC	$ 1,216,175	1.60%	$ 1,692,135	1.50%	139%	12.00%	21,751	5,692,210	10	C 2
WASHINGTON	GAS	C-OIL	ELEC	$ 1,159,804	1.10%	$ 2,462,991	1.30%	212%	18.00%	34,500	9,713,455	11	C 2
WISCONSIN	GAS	COAL	ELEC	$ 2,686,798	1.61%	$ 6,006,54[illegible]	2.14%	233%	12.00%	34,062	13,873,934	12	CO2
YALE	OIL		ELEC	$ 1,987,634	1.60%	$ 7,520,308	4.50%	378%	36.00%	9,000	10,000,000	12	CO1
AVERAGE					1.24%		2.14%	246%	17.53%				

* A = 4 YEAR COLLEGE C = 4 YEAR UNIVERSITY 1 = PRIVATE
B = 2 YEAR COLLEGE D = PROFESSIONAL 2 = PUBLIC

UNIVERSITIES AND 4 YEAR COLLEGES
SHEET 2 OF 2

AMERICAN COUNCIL ON EDUCATION
NACUBO - APPA ENERGY TASK FORCE
ENERGY CONSUMPTION SURVEY

March 27, 1975

EXHIBIT I

				FISCAL YEAR 69-70		FISCAL YEAR 74-75 PROJ							
College or University	Primary Fuel Type	Secondary Fuel Type	Other Purchased Energy Types	Total Energy Cost In Dollars	Energy Cost As A Percentage Of Total Institutional Expenditures	Total Energy Cost In Dollars	Energy Cost As A Percentage Of Total Institutional Expenditures	Energy Cost Ratio 74-75 over 69-70	Percentage Reduction In Energy Consumption Due To Conservation Program	Enrollment H.E.G.I.S. - F.T.E.	Institutional Gross Square Footage Serviced	Length of School Year In Months	Type of Institution*
AMARILLO	GAS		ELEC	$ 91,147	2.80%	$ 150,560	2.60%	165%		2,964	645,952	12	B 2
ANGELINA	GAS		ELEC	$ 34,961	3.80%	$ 42,947	2.90%	123%	14.50%	801	161,728	12	B 2
DALLAS C.C.	GAS		ELEC	$ 95,305	1.10%	$ 734,160	2.80%	770%		16,055	1,244,381	12	B 2
GRAYSON JR.	GAS		ELEC	$ 36,442	1.90%	$ 115,815	4.00%	318%		2,317	523,371	12	B 2
JEFFERSON ST. JR	GAS		ELEC	$ 41,351	1.50%	$ 232,862	4.20%	563%		5,677	395,006	12	B 2
LAREDO JR.	GAS		ELEC	$ 45,109	4.10%	$ 123,774	3.40%	274%		1,946	438,682	12	B 2
ODESSA JR.	GAS		ELEC	$ 49,002	1.37%	$ 58,149	1.50%	119%		3,176		10.5	B 2
ST LOUIS JR.	GAS		ELEC	$ 544,771	4.10%	$ 704,021	2.70%	129%	16.10%	17,190	1,700,000	12	B 2
SAN ANTONIO JR.	GAS		ELEC	$ 141,225	1.40%	$ 400,000	2.20%	283%	13.70%		854,582	12	B 2
TARRANT CTY JR.	GAS		ELEC	$ 153,456	2.90%	$ 270,000	2.00%	176%	4.40%	9,882	932,132	12	B 2
AVERAGE					2.42%		2.64%	229%	12.17%				

* A = 4 YEAR COLLEGE   C = 4 YEAR UNIVERSITY   1 = PRIVATE
B = 2 YEAR COLLEGE   D = PROFESSIONAL   2 = PUBLIC

2 YEAR COLLEGES
SHEET 1 OF 1

Senator Pell. Our next witness is Mr. Calvin M. Frazier, commissioner of education, State of Colorado, representing the Council of Chief State School Officers.

STATEMENT OF CALVIN M. FRAZIER, COMMISSIONER OF EDUCATION, STATE OF COLORADO, REPRESENTING THE COUNCIL OF CHIEF STATE SCHOOL OFFICERS, ACCOMPANIED BY JOHN ADAMS, LEGISLATIVE LIAISON

Mr. Frazier. Senator Pell, I have with me this morning John Adams, who is our legislative liaison with the chief State school officers.

I should say at the outset that I come pretty much as one chief looking at this bill, and do not necessarily reflect positions that are going to be stated here in terms of the chief State school officers as a group.

The chief State school officers have been very much in support of your effort, support this bill; and have adopted policies since last fall, in fact prior to that, urging pretty much the kind of thing that you are suggesting in this legislation. So, I think it is fair to say they are in general support, although I am going to talk about specifics in this bill, and I would not want to commit them to those specifics.

My background as commissioner of Colorado included the participation as a lead State in an about five-State effort recently that extended over a 3-year period of time to bring about greater conservation in the public schools of all the States. Colorado has joined with Massachusetts, North Carolina, Iowa, and Washington in doing a lot of work in this area over the last 3 years.

I think the case for the bill has been built throughout the morning, and I want to go into some very specifics we are concerned with, and deal with this, if I could, for the next few minutes, go into that.

And be assured again that I see great support for this bill, and this is meant to be helpful testimony.

The first issue is one that involves the requirement for a Federal, local, or State sharing of the costs. That is a great concept, and one that I think has been used effectively by Congress over the years. It may be particularly defensible here because you are expecting a return that will be realized because of this investment. So, in general I am in favor of this cost sharing.

But, let me put that now in terms of the context of the problem, and that is the timing problem. If I could use my own State, Colorado, as an example, we are now about to be given our appropriation for the next 12 months, beginning July 1, 1977. At that point we will have all the moneys in the State for higher education, and for the department of education, until July 1, 1978. We will not be able to make a request—should this bill pass in the next few months and this opportunity should become available—it would be next fall before we can go to the State legislature with a proposal to set aside moneys for matching in order to qualify for funds under this bill. The legislature will meet in January, will go through

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the spring, and pass a bill, a legislative bill, probably in June. It will not be until July 1, 1978, almost at the end of the fiscal year 1978 budget year, before we would know that we would have the matching money. So, I see a timing problem here by injecting the matching concept, that I think is a very real one.

Now, having raised the issue, let me mention alternatives. First of all, I think you could remove all cost sharing in the bill. I do not think that is an acceptable alternative, but that is one that would immediately start the flow of money because there would be no matching to undertake. I might say the same problem exists at the local school district level; they are already in the middle of their budget year, and they have already begun to think in terms of the budget year starting on July 1. They are using remodeling moneys, it may be that they have to go to a vote of the people, and that might give them a little more flexibility.

Since eliminating the matching money is probably not an alternative, there is a second one that I would like to urge for consideration of your staff and you, and that is that you look at the amount going to technical assistance, and separate that from the matching requirement. In other words, if that provision were removed from the technical assistance section, moneys could begin to flow almost immediately upon passage of this bill to all the States to begin building this technical assistance capability. If that aspect were advanced and were put into play, I believe that the technical assistance provided in that manner would then lay an excellent base for the funding of the demonstration project, and the basic grants possibly in another year would make it a higher quality product in those applications by virtue of putting in place first the technical assistance. In other words, you could start with that for 1 year, and then begin to phase in for 4 years the basic grant and demonstration project part. So, the technical assistance provision would last 5 years, and the other would last 4, and I would build on that base. That would be, I think, an alternative that I personally would like to suggest would be utilized.

If the other is maintained as is, we may find the States are unable to make the applications, and it may appear falsely that States were not interested in applying for that money; I think that would be a sad interpretation.

A second issue that I see is one of the point of decision in regard to the basic grants. I would have to say that I am coming from a position where I support as much decisionmaking at the State and local level as possible. I feel that where the formula has been provided in the act and it says 80 percent of the money should be set aside for the States, in proportion of their population, and so forth, that total amount of money has now been determined for a State. I think with sufficient guidelines and direction from the Federal Government, it would be better to maintain, then, that projects are developed at the State level; are reviewed at the State level; are approved at the State level, and this would provide faster turnaround. It would eliminate the idea now that States may comment on it. I think that is not the kind of direction that is necessary, but if we do the reviewing and the commenting and then the Federal goes through the review and approval, I think we have enhanced the paperwork problem and expanded duplication in an unnecessary way.

I would like to go back to the comments that Dr. Hansen made earlier on the AASA, and that is a very key point, regardless of where the point of approval is made. If the Federal Government retains approval at the commissioner level, or if the State had this, there is need to provide some guidance as to the distribution of money between higher education and kindergarten through 12. The reason I think that is a very critical point is that in many States the State general fund goes to higher education. So, higher education deals directly with the State agencies. The local school districts quite often are the ones providing remodeling and renovation money—that is at least in half the cases.

If a State agency is making a decision on this, then there may be a temptation to save State general fund moneys by giving support to higher education, rather than safeguarding the kindergarten-12 level. So, that is a point that I think should be looked at.

A second concern that I would like to raise, that probably needs to be clarified, comes up in the provision in regard to basic grants, where it suggests that approximately 19 percent of the money then would be retained at the commissioner level for, I guess, discretionary grants. I think the intent on how the 19 percent is to be used ought to be spelled out by Congress, and not left to be second-guessed in terms of establishing rules and regulations. If this money is to be set aside for the nonprofit higher education institutions, that should be stated in the act itself. If there are other reasons to maintain that money, I think it should be indicated otherwise. Nothing comes through, as you read the bill, why there is a separation to 80 percent that goes out to States, and 19 percent that is more or less retained at the Federal discretionary level.

A final point is in relationship to calculations now based on in terms of basic grants on population. I raise the question in my mind, in my paper, when you are dealing with fuel and energy consumption, is there a direct relationship between population and fuel consumption and the cost going to energy. This may be true, but I think it would be worthwhile to see if there are other ways of building a formula that more nearly reflects energy consumption. I make one suggestion in the paper, but the committee may find others.

Lastly, there are two or three points that I include in my analysis here, that I think would add to the bill, and I indicated two or three specific provisions. One I would like to note, and that is in terms of the technical assistance. It deals with developing studies, carrying on evaluations, and so forth. The best technical assistance with the highest payoff would probably be workshops for maintenance personnel, architects, engineers, for school administrators, and others. We have found a very high return in terms of savings with this kind of guidance and technical assistance, when provided, at a relatively low cost of expenditure.

There are other ideas, and in closing I would ask this, that in terms of the distribution of money, it points out roughly $300 million for basic grants; $150 million for technical assistance; $50 million for demonstration projects——

Senator Pell. We will have to work to get that.

Mr. Frazier. I know, although it is a great starting point.

There may be value in developing a closer tie between the technical assistance provision and the demonstration projects, inasmuch as the demonstration project deals with demonstrations, and studies, and evaluations, and technical assistance does, too. Tying the two together would encourage the States to utilize those demonstration centers in their studies, and not develop a separate network. Again, back to this, the idea is in this paper, and may be helpful. It is a great idea. I commend you for meeting with the chiefs last Tuesday for breakfast when we were here, and for taking the leadership on this bill.

Senator Pell. Thank you very much. I can assure you that each one of these suggestions will be looked at and carefully considered. Thank you very much for your suggestions. They are the kind that really help us, not general statements, but specific suggestions.

Mr. Adams. I just would like to say that Mr. Frazier was fortunate to get out of the snowstorm in Colorado, the plane was delayed, and he finished his paper at 6 o'clock this morning. He is now rushing to the airport to return to Colorado.

Senator Pell. Truly a "Red Eye Special."

Mr. Adams. It sure was.

Senator Pell. Thank you very much.

[The prepared statement of Dr. Frazier follows:]

United States Senate Sub-Committee Testimony

S701 EMERGENCY EDUCATIONAL ASSISTANCE ACT

Friday, March 11,1977
Colorado Commissioner of Education, Dr. Calvin M. Frazier

(The following comments represent the opinions and ideas of one Chief State School Officer and is not to be interpreted as a position statement of the Council of Chief State School Officers.)

In preparing these remarks for the consideration of this committee, I have chosen to direct my questions, concerns, and suggestions to the wording of the proposed Act. The arguments presented in support of the Act have been articulated by many. I support the intent and basic concepts of the Act, as well as the urgency of this proposal as presented very ably by Senator Pell in his introductory statement in the February 10, 1977 Congressional Record.

My testimony is organized around three major recommendations and three suggestions for minor modifications.

Issue One. The requirement of funding the basic grants, demonstration projects, and technical assistance on a federal-state cost sharing basis poses a significant planning problem for state agencies and educational institutions. The concept of cost sharing is not an unrealistic expectation but it becomes a problem when viewed in the time sequence described in the Act for funding programs due to begin during the 1978 fiscal year and extending into FY 1981.

Most state departments of education and institutions of higher education have made their budget requests to the state legislatures for FY 1978. Some legislatures have already set appropriations for 1977 and the first half of 1978. Personnel and building funds have been or are about to be approved. Matching money for many states can not be requested until the next budget cycle and the results will not be known until sometime in 1978, at best, for FY 79. Local school districts face similar timing difficulties although these units would have some flexibility if the funding source involved local bond elections.

Recommendation. If Congress wants to achieve early initiation of this Act in FY 78, it will be necessary to waive all the matching requirements called for in the Act. States and educational institutions could move immediately into the application process without seeking state legislation or local funding support. Assuming the matching expectation to be a fundamental concept in the proposal, I would see another alternative that this Committee might consider.

I would urge that the matching requirements for the Technical Assistance provisions be dropped as the first step to resolving the time and matching problems. This could be accomplished by dropping reference to "federal share of the cost" in Sec. 8(a) and related references in Sec. 9(c)(1) and (2). This would encourage dollars to flow rather quickly to states for technical assistance. Providing this support in FY78 would stimulate energy saving steps to begin immediately for many low-cost programs. It would also provide technical assistance through state offices to those agencies and institutions seeking to develop demonstration project proposals and analyses and applications for basic grants.

If the above recommendation is adopted, it would be desirable to consider slipping the four year funding cycle for basic grants and demonstration projects to a FY79 - FY82 basis rather than the presently proposed FY78 - FY81. At the same time there would be a need to extend the time frame of the Technical Assistance section by one year to coincide with the adjusted FY82 termination in the other two Sections.

By having the Technical Assistance provision in place in advance of the other projects and grants, I believe the quality of the latter two programs would tend to be much improved.

Issue Two. At the present time, the Act envisions all final approvals for basic grants to be made by the U. S. Commissioner of Education. State agencies are involved to the extent of making "comments" on the basic grant applications before these documents are submitted to the Commissioner.

This particular state official sees this as a problem because it locates the point of approval inappropriately at the federal level. Since the Act has already suggested a formula whereby each state has a set allocation, it seems unnecessary to remove the decision-making responsibility for projects within the state to a federal office. Within Congressional intent and guidelines local needs can best be judged at the state level. State approval will also reduce the time required for review and decision-making. The present wording leads to a duplication of effort and paperwork by requiring state review and comment and federal review and approval.

Having pre-determined the amount of the entitlement for each state, approval by the US Commissioner appears to represent an unnecessary by-pass of the state educational agency. With a fifty percent matching requirement provision, final federal-level approval of each project within the state is irritating to the states. In as much as this Act establishes a limitation on the number of years of federal funding, it seems most important that a commitment to build state-level, decision-making capacity is made in this Act.

Recommendation. When the Act proposes a formula for determining the entitlement of each state, final approval for basic grants to educational institutions within the state should rest with the state agency. Amendment of Sections 4, 6, and 9 should be made to provide for this change.

Consideration should be given to clarifying the Congressional intent relative to the basic grant percentage (approximately 19 percent) retained by the Commissioner for distribution under Sec. 4(a)(3). If these monies are seen as being primarily for non-profit institutions of higher education or educational institutions unable to provide the fifty percent matching money (Sec. 9(d) then this intent should be so stated. If these monies are not reserved for any particular group, is it necessary to provide for this separate percentage of basic grant funds?

Issue Three. The basic grant allocations to states are to be calculated on the basis of the population of a state in relation to the population of all states. The Act, however, is advocated on the basis of a need to eliminate wasteful energy practices, reduce spiraling fuel costs, and assist those faced with "harsh and persistent adverse weather conditions".

Is the distribution of basic grant funds on a population basis consistent with the intent of the Act? It would appear that population distribution and energy consumption and costs may not parallel each other.

Recommendation. A formula basis, other than population, should be considered for determining the distribution of basic grant monies to the states.

I do not have a defensible suggestion to make to the Committee as to an alternative formula. It would seem, however, that Congressional staff members should explore alternatives such as: the percent of utility costs for state educational institutions in relationship to their total operating expenditures. Ranking the states on a basis such as this ought to suggest a distribution pattern that would more directly address the concerns of the Act than relying only on population.

Several minor modifications should be considered by the Committee. These suggestions are as follows:

A. Under Sec. 8, Technical Assistance, (b)(1) insert a (C) to read:

- the conduct of seminars or workshops for maintenance personnel of educational institutions, architects, engineers, institutional administrators, and other appropriate individuals on energy practices, planning, and research findings.

(In Colorado and other states, it has been found that such programs yield a high return in energy saving adjustments at a relatively low presentation cost.)

B. Possibly under the Administration Section (Sec. 11), the Commissioner's office should be charged with establishing a centralized clearing house for materials, training programs, resources, and research findings related to institutional energy use.

(Again, Colorado's experience in directing the nation-wide Interstate Energy Conservation Leadership Project indicated a need for this type of center or disseminating assistance.)

C. Some reconsideration might be given to the dollar distributions proposed for the three provisions: basic grants (300 million), demonstration projects (50 million), and technical assistance (150 million).

As one state school officer, I would tend to support more of an emphasis on basic grants and a reduction in the amount of technical assistance. Secondly, there could be merit in combining the technical assistance and demonstration project concepts. This approach could lead to a distribution such as the following: basic grants (350 million) and technical assistance and demonstration projects (150 million). States would be encouraged to combine their technical assistance studies, evaluations, and training programs with demonstration project studies.

In closing, the proposed Act is needed federal legislation. The Act has a tremendous potential for long-range savings, but more important, it can be a vehicle for sensitizing educational leadership at all levels to the need to do a better job in managing energy consumption.

S701, The Emergency Educational Assistance Act, as introduced by Senator Pell, should be supported. The recommendations and suggestions contained in this document are meant to be helpful but ould not distract from the overall thrust of the proposed legislation. I'm sure Chief State School Officers pport this thrust as being consistent with the policy statement recently adopted by the Council at its November, 1976 meeting in Salt Lake City.

I close by expressing my appreciation to the Committee for the opportunity to appear before you today and to Senator Pell for taking the leadership in regard to this particular piece of legislation.

Senator **Pell**. Our final witness this morning is Mr. Lawrence Zaglaniczny, representing the Coalition of Independent College and University Students. Mr. Zaglaniczny?

STATEMENT OF LAWRENCE S. ZAGLANICZNY, NATIONAL DIRECTOR, COALITION OF INDEPENDENT COLLEGE AND UNIVERSITY STUDENTS (COPUS)

Mr. **Zaglaniczny**. Thank you, Mr. Chairman. I am the national director of the Coalition of Independent College and University Students, also known as COPUS. I know the time is late, so I will be very brief. I will not read my statement, but would like it placed in the record; I know you prefer oral testimony.

Senator **Pell**. It will be inserted in the record in full.

Mr. **Zaglaniczny**. Why is our student group supporting S. 701? It is clearly a bill for institutions, but from our point of view, it is also indirectly a bill for students. It is a financial aid bill of a sort. As a financial aid bill it is a little more forward-thinking than what we have at present, where the Government provides money allowing students to go to college. This bill will allow students to stay in college by keeping the cost down.

If institutions take advantage of this bill, we can expect energy costs to be reduced. Therefore we can expect the rise in tuition, the rate of increase in tuition to be moderated; for this reason we support this bill. We hope that institutions will take advantage of this program because it is going to keep the costs down for their students.

Our organization strongly supports this bill, and we will do everything we can to see that it is enacted and then implemented before this winter.

Thank you, Mr. Chairman.

Senator **Pell**. Thank you very much. I agree with you, this is a way of helping students, as well as institutions.

Mr. **Zaglaniczny**. I would agree with you in terms of the problems of air-conditioning. If I was not nervous, I would be asleep by now it is so warm in this room; and I think that might be happening in some of our lecture halls.

Senator **Pell**. I agree with you. But also, I realize that the blood runs more vigorously in students' arterial systems than in older people. But, do you not think if the temperature is around 60, that with adequate sweaters students could survive, and would probably catch fewer colds than before?

Mr. **Zaglaniczny**. I agree, I think there would be no problem, wearing sweaters.

Senator **Pell**. And if professors and teachers would maybe wear sweaters and even gloves, we could save a great deal of money. I was most struck by the fact that when you are in a cold climate, you found the instances of colds and chest ailments fewer than you do when you get into these very sluggish and muggish environments.

Mr. **Zaglaniczny**. Coming from upstate New York, I would totally agree with you.

Senator **Pell.** Thank you very much for your testimony.

This concludes the hearing on S. 701. I thank all the witnesses for their valuable support and testimony. I will leave the record of this hearing open for 2 weeks to receive additional information.

[The prepared statement of Mr. Zaglaniczny accompanied by material subsequently supplied for the record follows:]

Tel (202) 659-1747

copus Washington

The Coalition of Independent College and University Students
1730 Rhode Island Avenue N.W. Suite 500, Washington D.C. 20036

TESTIMONY IN SUPPORT OF S. 701

March 11, 1977

Mr. Chairman, I would like to thank you and the members of your subcommittee for the opportunity to testify in support of Senate Bill 701. I am Lawrence S. Zaglaniczny, National Director of the Coalition of Independent College and University Students, also known as COPUS. The Coalition is a student lobby and research group which represents the views of students who attend independent colleges and universities.

Although our organization's interests are primarily centered on seeking a more balanced and richer Federal system of student financial aid, this Bill is of interest to students in the private higher education sector. S. 701 does not directly aid students--so why are we supporting this legislation and hope to have it enacted into law?

Very simply, the intent of this Bill is to promote energy conservation measures through direct grants, demonstration projects and technical assistance to colleges and universities. This goal is admirable on its merits alone. Higher education institutions, because of their year-round operations and large physical plants, can make a large contribution to saving energy, or at least, to not wasting our resources. We hope the incentives provided in this legislation will spur institutions to assist President Carter in his national energy plan. In any event, many colleges have instituted energy saving measures on their own initiative. This legislation is necessary to assist in the further expansion of conservation plans. This Bill is for institutions, however, it is also for students albeit indirectly.

The most flexible source of revenue for private college and universities is tuition. If energy costs to institutions rise because of unusual weather conditions, inflation, decontrol, international price increases or boycotts, then institutions to meet the increased fuel bill can only look to raising these monies from a limited number of sources. The most likely candidate for generating such funds is from tuition increases.

If S. 701 were to be enacted and widely utilized by colleges and universities, then one would expect tuition not to always jump to a level equal to the rise of fuel costs. Through conservation savings the rate of increase in tuition costs may be expected to be moderated as compared to those schools that do not practice the conservation strategies that this Bill would encourage. So, as students, especially coming from private institutions, we do have a stake in this legislation and strongly favor its passage. Senate Bill 701 will not prevent energy related tuition increases, but it will moderate those increases for those colleges that take advantage of the program.

In conclusion, this legislation will foster conservation efforts already underway. It will provide incentives for institutions to develop energy conservation policies and practices. For students, particularly for those who attend independent sector colleges that take advantage of the program, they will be assured that the tuition dollars they pay will be moderated in the rate of its increase and not wastefully go up the chimney, out the door or through leaks in windows.

The Coalition of Independent College and University Students supports and urges quick consideration and implementation of Senate Bill 701 before next winter.

State of Alabama
Department of Education
State Office Building
Montgomery, Alabama 36130

Wayne Teague
State Superintendent of Education

March 4, 1977

MAR [illegible] 977

Senator Claiborne Pell
Russell Senate Office Building
Room 325
3425 Prospect Street
Newport, Rhode Island 20007

Dear Senator Pell:

It was a privilege for me to be invited to testify before your Subcommittee on Senate Bill 701, the Emergency Education Assistance Act.

Since my schedule makes it impossible for me to be in Washington for the March 11 committee session, I trust that you will accept my testimony in written form.

This is very worthwhile legislation and I hope that we can help generate the support needed for passage during this Congress.

We are sending copies of my testimony on Senate Bill 701 to members of the Alabama congressional delegation for their information and we believe they will share our interest in this legislation.

If you need additional information from Alabama, please contact Dr. W. E. Mellown, Jr., Coordinator of Federal Programs in our Department, who represents us in such matters.

Sincerely yours,

Wayne Teague
Wayne Teague
State Superintendent of Education

WT/cw
cc: Alabama Congressional Delegation

UNITED STATES SENATE

SUBCOMMITTEE ON EDUCATION

Honorable Claiborne Pell, Chairman

11 March, 1977

Statement of

WAYNE TEAGUE
STATE SUPERINTENDENT OF EDUCATION

ALABAMA STATE DEPARTMENT OF EDUCATION

SENATE BILL 701

EMERGENCY EDUCATIONAL ASSISTANCE ACT

Mr. Chairman and Members of the Senate Subcommittee of Education, I am Dr. Wayne Teague, State Superintendent of Education from the State of Alabama. It is a pleasure and an honor for a Chief State School Officer from the "sunny south" to have the opportunity to present a testimony to this committee on S. 701, The Emergency Educational Assistance Act. Mr. Chairman, this is an important and significant bill that will provide the educational institutions of this Nation with the opportunity to conserve energy, to plan for long-range conservation and to provide technical assistance to educational institutions. We appreciate the leadership that you and this committee have provided in presenting this bill to the Congress for consideration. We realize that energy conservation can lead to significant decreases in fuel consumption.

As you know the jet stream was confused and dumped frigic masses of arctic air into the southern states earlier this year. For several days the thermometer hovered slightly above zero and the temperature in Montgomery, the heart of Dixie, was lower than it was in Nome, Alaska. Most of our schools are not designed for this kind of weather. As a result schools closed all over the state. We have lost more school days because of severe weather and illness resulting from it than I can ever remember. If predictions of climatologists are right, the world may be headed for even more severe cold weather in years to come.

Below, I am presenting information on a survey showing the number of days schools in Alabama were closed because of inclement weather and because of fuel shortage. In adition, the survey shows the increase in fuel cost to the schools in our State.

Average Number of Days Missed in Alabama Schools Because of Weather and Fuel Shortage School Year 1976-77

Avg. Days Missed Weather	Avg. Days Missed Fuel	Total Avg. Days Missed
2.9	2.25	5.17

The summary shown below is of a building survey taken in Alabama in June 1976. Mr. Chairman, I believe I am safe in saying very few of these buildings have any energy saving devices such as insulation, weather stripping or storm windows.

Years of Construction - Alabama Schools*

Year	Number Erected	Percent of Total
Prior to 1932	497	9.2%
1932 - 1945	654	12.2%
1946 - 1960	1,705	31.8%
After 1960	2,496	46.6%
Total	5,352	

* Based on a Survey by the Alabama Department of Education
June 1976

From these figures you can appreciate our problem in Alabama. More than half of our school buildings were constructed at least 16 years ago. Many of them are 20, 30 and even 40 years old. They are not equipped with modern fuel-saving facilities or the kind of insulation needed to protect school children and their teachers from extremely cold weather.

Mr. Chairman, the problem we have here is that school administrators are not aware of the energy problems which is a matter of the inability to plan and afford proper energy conservation techniques. The problem in Alabama, as in many states, is that the citizens have become increasingly more aware of the tax burden placed upon them and consequently have become reluctant to pass tax measures.

We have been informed by a recent publication of the Tennessee Valley Authority (TVA) that a completely uninsulated frame building; with no storm windows or storm doors, assuming that 15 percent of the outside wall area is made-up of windows and doors, and that the infiltration rate is one air-change each hour - that the amount of heat lost through the various portions of the building is as follows.

	Heat loss
Ceiling area	45%
Floor area	20%
Windows and doors	12%
Outside walls	12%
Infiltration	11%
Total	100%

The majority of our school buildings were built when energy was relatively inexpensive. There were few incentives to encourage the conservation of energy. Consequently, most homes do not have adequate insulation. More can easily be added. If there is some ceiling insulation, adding more to bring it to recommended levels will increase comfort, save money, and save energy, though to a lesser degree than when insulation is installed where there was none before.

Even without the ever increasing demand for fuel which this winter's cold spells have produced, there is more money spent on fuel than ever. We note, Mr. Chairman, that our energy cost in Alabama rose 56%. When we consider, as you indicated, that 10% of the energy used in this Nation was by the educational factor, we are quite aware of the need for education energy conservation measures.

Appalachia area, comprising thirteen states, have vast deposits of fossil fuels, especially coal, and producation from these reserves has played an important role in the Region's and the Nation's history. But during the 1950's and 1960's numerous technological changes and new energy sources caused the Region's extractive industries, especially coal mines, to cut back output sharply. By 1971, Appalachian fuels; coal, oil, natural gas and hydro-power furnished only 16 percent of the nation's domestic energy supply. The impact of this long decline was most severe in the Central Appalachian coal fields, where there were no alternative industries to take up the employment slack and provide some measure of economic stability. The harsh result was a sharp increase in unemployment and massive out-migration of workers and their families in search of jobs elsewhere.

This problem is not unique to Alabama. I feel that the problem presented here for Alabama would be fairly common throughout the Southeastern United States. We will need more help in using less energy ahead. We must accept this guideline and prepare now to conserve energy, to find new sources of energy and to provide technical assistance to schools in energy conservation matters. James Schlesinger, the White House Energy adviser, noted recently that our nation's supplies of natural gas have been dropping about 4 per cent each year. While we are fortunate in Alabama to be sitting on top of enormous deposits of coal and we have producing oil and gas fields in our state, this hasn't helped lower the cost of such fuels to our schools. We know that the days of cheap, abundant energy are past. Energy conservation is vital in the immediate future. Presently, we must protect the quantity of our environment; air, land and water as we move to meet our increase in energy needs.

Mr. Chairman we are aware that there are many energy conservation measures that may be implemented, but these measures are costly. A few examples of these energy conservation measures that can be applied to schools are pointed out to us in a recent TVA publication. Schools could convert to florescent lighting fixtures, lighter colored finishes on walls, cabinets and counter tops for greater light reflection, the installation of insulated draperies to help reduce heat gain or loss. Thermostatically controlled attic ventillators will help reduce high temperatures in the attic during the warm summer months. Weather stripping around the doors and windows will improve in heating efficiency of most buildings.

Many of our schools have stretched their budgets to the breaking point in an effort to take care of substantial increases in their utility bills. School officials are doing what they can to conserve fuels used for heating buildings. Oxford High School in northeast Alabama achieved savings in fuel costs estimated at 14 per cent by strict control of thermostats. Design temperatures were reduced from 75 degrees in occupied areas to 65 degrees with a cutback to 55 degrees in unoccupied areas. A savings in excess of 50 per cent was realized over a system with no controls at all. It is my understanding that a number of our colleges and universities have realized savings in utility costs through lower thermostats and diligent efforts to turn off unneeded lights.

We realize that many of our school plants are energy wasteful and aren't equipped to take advantage of more efficient operating techniques now available. Funding provided by Senate Bill 701 would be most helpful to our public schools in conserving heating fuels.

We are most appreciative of the opportunity to provide this testimony on a bill we consider to be of vital importance to schools of our Nation. We wholeheartedly support this bill and wish to urge the members of this committee and members of Congress to support this bill. May I respectfully point out, however, that matching requirements recommended by this bill may lessen the intent of the legislation. The schools of our Nation are faced with a critical financial cut and I feel that the "matching funds" definition of this bill may simply mean that the, "rich will get richer and the poor will get poorer". I would like to ask the members of this committee to give the, "matching funds" definitions of this bill some additional thought.

I commend you, sir, on the Technical Assistance portion of the act, ([illegible]. 8). This provision will greatly enhance the effectiveness of the program and will help the state educational agencies to provide more adequately for the energy crisis in the usage of fuels.

We would prefer to see additional funds being made available to additional local education agencies as opposed to the demonstration projects (Sec.7) portion of the bill. It is our belief, at this point, that these funds might be better utilized in implementing LEA programs.

In closing, Mr. Chairman, we commend you for your foresight in presenting this outstanding measure to this committee. We feel that this bill, which is designed to help schools, colleges and Universities across the nation to deal with the increasing cost of energy, will greatly enhance our school programs.

TESTIMONY

ROBERT N. HENDERSHOT, ACTING SECRETARY

PENNSYLVANIA DEPARTMENT OF EDUCATION

BEFORE THE U. S. SENATE SUBCOMMITTEE ON EDUCATION

CLAIBORNE PELL, CHAIRMAN

HEARING - MARCH 11, 1977

Mr. Chairman, the Pennsylvania Department of Education appreciates the opportunity to testify in support of the Emergency Educational Assistance Act, a piece of legislation that would provide help we in Pennsylvania desperately need.

This unusually severe winter has brought home to us the fact that we need to do all we can to conserve energy right now. By the end of January, shortages of natural gas and other fuels had reached crisis proportions in the East. Extreme temperatures and low pressure in gas lines led to a very real possibility of factories being forced to close and entire communities being housed and fed in mass care centers.

To conserve fuel--and thereby reduce the chances of greatly increased unemployment and a severely damaged economy--Governor Milton Shapp on January 26 issued a proclamation closing all public and private schools in the Commonwealth. Colleges and universities, as well as commercial establishments and homes, were urged to operate under heavy fuel curtailment.

In our estimation, millions of cubic feet of gas were saved by closing the schools for three days--but that didn't solve the crisis. At the end of those three days, schools were reopened on a selective basis (depending on whether local utilities could provide them fuel without jeopardizing higher energy priorities, such as homes and hospitals, in the area). Some schools were shut down as long as three weeks; others curtailed or cancelled extracurricular activities such as sports; almost all had their thermostats lowered to 62 degrees during the day and lower at night.

In Pennsylvania, the energy problems caused by this winter's freezing temperatures are compounded by the fact that some fuel allocations are based on a normal year's consumption. What that means is that schools have to pay the cost of extra fuel used because of the unusually cold weather as well as a penalty for using more than their allocation. Many schools, in other words, are purchasing fuel under penalty conditions which have doubled, tripled and in some cases even quadrupled not the daily consumption of fuel, but the daily cost of operation. It goes without saying that students are being shortchanged as a result.

In addition to paying high prices for fuel, many schools have been forced to take extreme actions to conserve energy--that is, they have had to alter their facilities or convert their heating systems to accommodate alternate fuel sources or combinations of fuel sources that appear to be more plentiful. About 800 public school buildings in Pennsylvania are planning to convert this year to other fuel sources, at a total cost of at least $20 million.

Needless to say, the extra costs of energy have placed an enormous burden on the already strained budgets of schools, colleges, and universities in the Commonwealth. In the case of some private colleges already on the brink of bankruptcy, these extra costs might even be enough to push them over the edge. We conservatively estimate the increase for all schools and colleges at $92 million over and above the approved budgets for fiscal year 1976-77. The breakdown, by area of expenditure, is shown in the following table:

Public Schools (Basic Education)	
Additional fuel costs	$33,000,000
Emergency maintenance due to cold weather	3,000,000
Fuel conversion costs	20,000,000
Nonpublic Schools	
Conversion, additional fuel costs, emergency maintenance	15,000,000
State-Owned Colleges and University (14 institutions)	
Additional fuel costs only	3,000,000
State-Related Colleges (Pennsylvania State University, University of Pittsburgh, Temple University, Lincoln University)	
Additional fuel costs only	6,000,000
Private Colleges and Universities (112 institutions)	
Additional fuel costs only	10,000,000
Community Colleges (14 institutions)	
Additional fuel costs only	2,000,000
	$92,000,000

Now that most schools are back to their normal operations and warm weather is on the way, many people will forget the hardships--even emergencies--posed by the cold winter. But the fact is, the rising cost of energy will continue to plague the entire educational system of Pennsylvania and other states that consume large amounts of energy unless something is done about it.

People concerned about education in our state have formed a task force to study the energy problems of schools and to suggest methods of conservation. The task force, composed mainly of representatives of state agencies, professional associations (teachers' groups, school board groups, etc.),and community groups, is drawing up guidelines for immediate, interim, and long-range energy conservation plans. At the same time, workshops are being arranged to inform school mechanical engineers and custodial employes about ways to use fuel more efficiently.

The task force, in addition, is devising a measurement tool that will be used to audit energy use in every Pennsylvania school building. Based on that audit, we will make recommendations as to what individual schools can do to reduce their energy costs.

Unfortunately, it will be impossible for some schools to implement the recommendations we make unless they receive additional money (especially where retrofitting and fuel conversion are concerned). It is especially difficult for schools to make room in their budgets for renovation of buildings when teachers are being furloughed and programs are being cut In short, the well-documented financial crisis facing our nation's schools impedes them from taking expensive conservation measures, even though those actions would pay off in the long run.

In Pennsylvania, a state known for coal production, only 550 of 4,279 public school buildings surveyed are heated by coal (1,649 are heated by natural gas, 1,732 have oil burning furnaces, 259 are electrically heated, and 89 are heated by a combination of systems). With the help of sorely needed federal funds, more would be able to switch to coal; others would be able to insulate and install energy-saving devices.

In view of the information I have presented, we in the Pennsylvania Department of Education strongly support the intentions of the Emergency Educational Assistance Act, but we have two general suggestions in regard to the bill. First, recognizing the heavy financial burdens already weighing on state and local agencies, we would like to see an increase in the federal share of the funding, if at all possible. Second, we believe that a great deal is known about energy saving methods in construction and renovation. I would urge that the authorization levels for basic grants and technical assistance be increased and less emphasis placed on demonstration grants.

Mr. Chairman, I think my testimony paints a fair picture of the crisis we faced this winter--and will continue to face unless we get some assistance. We stand ready to support you in your efforts to help schools undertake this costly but needed endeavor.

MECHANICAL CONTRACTORS ASSOCIATION
OF AMERICA, INC.

Suite 750, 5630 Wisconsin Ave., Washington, D.C. 20015
Tel. (202) 654-7960 TWX: 710-825-0423

March 11,1977

STATEMENT ON
SENATE BILL S.701
BY THE
MECHANICAL CONTRACTORS ASSOCIATION OF AMERICA, INC.
TO THE
SUBCOMMITTEE ON EDUCATION, ARTS AND HUMANITIES
OF THE
SENATE HUMAN RESOURCES COMMITTEE

Mr. Chairman and Members of the Subcommittee:

The Mechanical Contractors Association of America, known by its initials MCAA, appreciates this opportunity to present our statement in support of S.701.

MCAA is a construction trade association of about 1500 firms,employing approximately 125,000 persons. Almost all of the firms employ union labor.

The work of a mechanical contractor is used to move fluids, both liquid and gas. This includes the fabrication and installation of heating, ventilating, air conditioning and process piping systems, and further encompasses service, maintenance and the testing, adjusting and balancing of these systems. Our work affects multi-residential, commercial, public and industrial facilities. The equipment our members install are the principal users of energy in buildings, and energy is the key to our industry. Consequently conservation and effective use of our nation's fuel resources are and have been concerns of MCAA. We have extensive experience and know-how in this field. Even before the OPEC oil embargo in 1973, MCAA had formed an Energy Conservation Committee to inform and assist our members in the areas of energy conservation. Two of our publications on this subject are enclosed with this statement.

MCAA has evaluated S.701 as introduced. Further, our representatives participated in a conference, conducted by the American Association of School Administrators and other interested parties, where this bill was analyzed and measures for practical implementation were discussed.

Based on our study of the bill and the results of the AASA conference, we believe that the legislation can make a significant contribution toward the nation's energy conservation effort. For that reason, the bill and its objectives have MCAA's strong backing. We offer these supporting comments:

First, S.701 provides incentives to encourage energy conservation in institutions in every community in the nation. We fully recognize that the inevitable and continuous rise in fuel bills eventually will force schools to undertake energy conservation. However, the assistance provided through grants can permit school administrators to move into more intensive conservation programs now.

The grants for building retrofit can produce immediate benefits in selected buildings. Results and lessons learned from these relatively few buildings can provide incentives and practical experience that school districts can apply to other buildings, perhaps using their own funds.

We also believe the bill is timely. The severe winter of 1976-1977 has presented the most dramatic demonstration of our national vulnerability in energy supply since the OPEC embargo. The inordinate demand for fuel, the shortages and rising prices are felt by practically everyone. S.701 offers a helping hand to schools, hard hit by energy costs and other problems. Further, that assistance is accompanied by funds that will enable schools to avoid diverting money from educational programs into meeting the increased operating costs.

The technical competence to accomplish energy conservation in buildings is available immediately. Mechanical contractors and others in the construction and engineering fields are well aware of the technology and procedures to make buildings more energy efficient. Many of our own MCAA members are confident that they can readily achieve reductions in energy consumption in most industrial, commercial and public buildings by 20-25% or more.

This bill can help teach an important lesson. Even with increasing fuel prices building owners in the public and private sectors believe that funds are better expended to purchase relatively low-cost fuels and for other purposes rather than for basic renovation of equipment and facilities. S.701 helps schools to teach the wisdom of energy conservation without curtailment of other school services.

Further, we believe that the energy conservation programs promoted by S.701 will be successful and that the adage of "success succeeding" will again be proved. The work accomplished will have long lasting results on the buildings selected for energy improvement measures. Where a money-saving procedure works, the word spreads rapidly. When schools, a very visible part of the public domain, can demonstrate the effectiveness of energy saving measures, the lesson will not be lost on families of the students and the private sector. The proven techniques certainly can be applied elsewhere and undoubtedly will be.

This legislation will provide a stimulus to construction, which overall is still a depressed industry. The mandatory distribution of the grant monies will create jobs throughout the country. In addition, if projects stimulate similar actions by local business and industry as we expect, additional work and jobs will be created by private funding. The bill, therefore, can have a positive near term and long-range economic effect. For the near term, jobs will be created; in the long-range, conservation now can help assure energy for jobs in the future.

We recognize that some persons may consider that the monetary cost of this program may be too high for expected results. But the consequences to our country of not moving immediately and aggressively into an effective energy conservation program can have far more serious implications than money can cure. What is the value to the nation today of a barrel of oil not imported? Or what will be the 1995 value to the nation of a barrel of oil or cubic foot of gas not burned in the 1970's? We do not know the precise answers to those questions, but we do suggest that an investment today that will save and provide energy sources for tomorrow is prudent.

Another area of concern to this industry is the matter of incentives. MCAA contends that with proper incentives, U.S. business and industry can solve our entire energy problems, since adequate knowledge and technology for energy conservation is already in hand. What has been and still is lacking is sufficient motivation and capital for people to implement energy conservation extensively. As one way of providing significant motivation, MCAA has developed a plan for tax incentives to homeowners, business and industry for energy conservation. Since your Subcommittee does not deal directly with business tax matters, details on this will not be covered at this time. Suffice to say, that MCAA's tax incentive plan is relatively simple and as we believe, workable. It has a tremendous advantage of providing tax credits to homeowners and commercial and industrial owners based on amounts of fuel actually saved, rather than capital outlays alone. We have enclosed a one-page explanation of this plan as part of this statement.

SUMMARY

To summarize, the Mechanical Contractors Association of America supports S.701 for the following reasons:

1. It provides incentives and assistance to encourage energy conservation in buildings used by a significant segment of the public across the country.

2. The bill is timely. There is an immediate and urgent need for an extensive energy conservation program nationally. The severe 1976-1977 winter has made much of the population aware of that fact.

3. The bill will bring into operation some of the extensive talent, know-how and technology for energy conservation presently available in the business, industrial and public sectors.

4. By demonstration and positive results, the program can have effects reaching into the private sector.

5. The money invested in energy conservation now can pay significant dividends in the future by helping assure future supplies of energy.

6. Productive, worthwhile work and jobs will be created now, with potential for increasing such work in the future, as energy conservation moves to other school buildings and construction in the private sector.

7. A demonstration of what one type of incentive can accomplish may encourage the Congress to provide other types, such as tax incentives, to encourage intensive energy conservation by homeowners, business and industry.

MCAA appreciates this opportunity for comment. We will be pleased to provide additional comments and detail as may be needed.

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Enclosure

MECHANICAL CONTRACTORS ASSOCIATION
OF AMERICA, INC.

Suite 750, 5530 Wisconsin Ave., Washington, D.C. 20015
Tel (202) 654-7960 TWX 710 825-0423

MECHANICAL CONTRACTORS ASSOCIATION OF AMERICA
PROPOSED
TAX CREDIT FOR ENERGY SAVING IMPROVEMENTS
IN EXISTING
COMMERCIAL/INDUSTRIAL BUILDINGS

ASSUMPTIONS:

1. There is no shortage of know-how in the U.S. private sector to achieve substantial actual energy savings, given proper incentives.

2. The incentives should be based on the principle of predictable results in energy savings.

3. The principles should be sufficiently broad and flexible to encourge full use of the inherent ingenuity of the U.S. private sector.

4. Energy savings can be accurately forecast by a qualified Registered Professional Engineer.

5. A certification by a Registered Professional Engineer will be as valid for the returns as a certification by a Certified Public Accountant.

6. The concept of tax incentives should be based on the principle that for each barrel of oil saved, an equivalent tax credit is given. (The equivalent can be applied to other fuels.)

7. The per barrel value of oil would be determined annually by the Secretary of Commerce based on world wide prices and value of saving to the national economy.

METHOD

Objective: To encourage energy saving investments through tax incentives based on the total amount of fuel saved and/or the capital expenditure involved.

1. Provide 12 percent investment credit for the installation of energy saving equipment. Further, provide additional tax credit for amount of electrical-generated energy or petroleum-generated energy (including natural gas) saved. Suggested method:

  a. Total annual energy savings based on energy saving property be calculated and certified by a Registered Professional Engineer.
  b. Convert savings to oil equivalent barrels of energy.
  c. Determine actual dollar value of a barrel of oil (Secretary of Commerce).
  d. Allow tax credit to be equal to number of oil-equivalent barrels saved, multiplied by dollar value of barrel of oil.
  e. Allow the calculated credits to be applied annually for a specified number of years.

2. As an alternative, eliminate investment credit for energy saving equipment and apply principles of paragraphs 1a, b, c, d, e as tax incentives.

STATEMENT ON ENERGY CONSERVATION ACTIVITIES PREPARED FOR HEARING ON S. 701, MARCH 11, 1977

By T. Byron Collins, S.J., and William [illegible] S.J.

Georgetown University

Georgetown University, Washington, D. C., founded in 1789 in a charter by Congress as an independent institution of Higher Learning has taken several successful actions in the face of increased costs of operating school facilities due to energy problems. The following describes its current status and future needs:

> Evaluated existing physical facilities and corrected thoses deficiencies (with savings) that can be controlled manually, and within general operating budgets and management.
>
> With the University's investment of $250,000: installed the base computer controlled integrated system for electrical demand, heating, ventilating, air conditioning: Electrical KWH consumption has dropped 33%. Heating and C.W. fuel BTUs have dropped 12%. For its 2.65 million square feet of physical plant about an additional $1.1 million will be required to complete the above system for all energy control points and computer programs, and core memory addition.
>
> The University has instituted a growing 9 minibus system operated now three years by students (at 35¢/ride) that save about 850 automobile trips daily.
>
> Georgetown has planned, and is about to go into construction of a 10 mega watt (100,000 #/hr) highly efficient steam generator utilizing high sulphur coal, cleanly, known as Atmospheric Fluidized Bed Coal Combustion System. This is a national exemplar demonstration for institutional applications, funded by ERDA with testing assistance from EPA and D.C. Department of Environmental Services. The current schedule calls for completion fall 1978. The project cost is $14.2 million with GU contributing $4.0 million. This generator will handle

the primary connected load and relieve existing gas and oil steam generators consuming now about 3.1 million gallons of oil annually. In a-dition, annual savings are estimated to be about $500,000 in fuel costs. The bed waste product of the system among several uses is a proven valuable fertilizer, portland cement, structural building and road construction applications, etc.

GU is now beginning planning of a Community Energy System utilizing coal as prime driver. This system master plans evergy conservation campus-wide orchestrating all energies with standard and innovative subsystems.

This plan unique in evergy conservation (known also as I.U.S., Integrated Utility System) though not the firest attempted to be planned, hopefully will be the first implemented utilizing many innovative solutions of energy management and techniques as a whole. and will set up criteria for future applications to new and existing institutions.

The results of a whole plan (I.U.S.) will determine properly future detailed needs for Capital Grant assistance.

Georgetown University has designed an Intercultural Student Recreation Center as an undergournd facility assisting greatly the energy conservation by utilizing the constant underground temperatures to advantage while still reclaiming valuable athletic green space on top.

In general the orderly completion of planning for overall energy management; the implementation of coal as prime energy; the implementation and orchestration of all energies as an integrated utilities system (I.U.S.); the University would now be in a position to optimally produce requirements for effective energy conservation elements and savings. Large capital amounts are needed for major renovations of older facilities in general, i.e. insulation, double glazing, other conserving modifications, etc., even after effective first measures. Increased capital amounts will be needed for higher cost new construction. All new facilities will be developed under tested criteria for energy management and available/near term advanced technology.

Replacement of entire building heating and A/C systems with those of more efficient design.

Installation of heat reclamation equipment for existing building systems, where feasible.

Insulation of burried steam, condensate and C.W. distribution piping.

UTILITY CONSERVATION

ACTIONS TAKEN

1. In winter hold temperature of spaces in use to 65°- 68° (except patient and other critical areas).

2. In summer hold temperature of spaces in use to 80° 78°- (except patient and other critical areas).

3. Turn off HVAC equipment at nights and weekends and in unused spaces.

4. After midnight drop heat in dorms to 65°.

5. During daytime on weekdays have air conditioning off in dorms.

6. Reduce light levels to acceptable minimums.

    Offices /Classrooms 50/70 ft. candles
    Drafting 100
    Dental, Labs, Cadavers - specials

7. Reduce steam pressure from central plant from 125 psi to 110 psi.

8. Extensive program of insulation on windows and doors, steam, CW and HW pipes.

9. Installation of thermostatic control valves for steam and HW radiators.

10. Engineering review of all systems to determine economically feasible improvements.

11. Purchase of computer to control on-off of equipment for energy consumption reductions as well as reduction of electrical demand peaks and to optimize use of electricity and fuel.

12. Reduce domestic HW temperature from 150° to 125°.

13. Reduce shower head and wash basin flow from 8 to 4 gpm in dormitories.

14. Reduced outside air intake where practicable when heating.

15. Installed photo electric controls on outdoor lighting where practicable.

16. Replaced incandescent with fluorescent and mercury vapor lamps where feasible.

17. Increased repair and maintenance program on traps and piping for increasing return of steam condensate.

18. Raise CW coil discharge temperatures and lower reheat water temperatures during cooling season.

19. Apply aluminum coatings on roof surfaces when repairing.

20. Provided low speed controls on boiler fan in central plant for use during low demand periods.

21. Minimize leakage and overheating of electrical distribution equipment by increased maintenance programs.

22. Conduct manual turn-off program of interior lights in unoccupied areas.

23. Discontinue use of decorative and non-security exterior lighting.

24. Changing valves on chill water distribution system @ buildings to balance load and reduce quantity of chilled water pumped.

25. Classroom lockup at night to consolidate usage to a few designated rooms.

26. Use of Econ-o-Watt fluorescent tubes (low wattage consumption tubes).

27. Use of solar film.

Senator **Pell**. The subcommittee is adjourned subject to the call of the Chair.

[Whereupon, at 11:40 a.m., the subcommittee adjourned subject to the call of the Chair.]

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